General Main



# ---Index to CONTENTS, January, 1933---

*The Semi-Annual Index will be found at the end of the December issue*


**Airports**
Buffalo Has A-1-A Airport ..... 11
Miami Has an Organized System of Airports ..... 63
Essential Characteristics for Airport Enclosures ..... 93

**Bridges and Viaducts**
Lighting the George Westinghouse Bridge. 102
The Newark-Jersey City Viaduct ..... 102

**Buildings, Public**
A City Hall and Courthouse of Modern Design ..... 79
Waterproof Carpet ..... 91
Color Floodlighting for St. Paul City Hall and Courthouse ..... 102

**City Planning and Zoning**
Fair Play in Paying for Improvements.... 71
Zoning and Planning Notes ..... 85

**Conventions**
When and Where ..... 89

**Engineering**
Who's Who in City and County Engineering 15
High Towers Aid New Survey ..... 81

**Finance**
Banishing the Depression More Urgent Than Balancing the Budget ..... 5
Self-Liquidating Loans Granted During December ..... 5
R. F. C. Reduces Its Interest Rate ..... 5
Self-Liquidating Projects to Be Accelerated 5
Road Officials Show Need of Continued Federal Aid ..... 5
A World Economist's View of Governmental Spending ..... 49
Economists Urge Increased Federal Aid to States and Cities ..... 54
Municipalities Ought to Receive a Larger Share of State Taxes ..... 62
Fair Play in Paying for Improvements.... 71
The Financial Reorganization of Johnstown 80
The Municipal Bond Market ..... 85

**Fire Prevention and Control**
Extensive Fire Training Course for Oklahoma Cities ..... 19
A Fire Department's Educational Display. 81

**Forward Steps**
Items Contributed by Officials ..... 79

**Government and Administration**
The New "You and Your Government" Radio Series ..... 53
A Real Home-Rule County-Manager Charter 69
Oklahoma Has Radio Talks on Government 86

**Housing**
Obsolete Housing Revealed by the 1930 Census ..... 86

**Legal Decisions**
The City's Legal Rights and Duties ..... 84

**Motor Equipment**
A New Front-End Fresno for Tractors.... 90
New Lug-Type Tire for Tractor Service... 90
A New 28-Horsepower Crawler Tractor.... 99
A Line of Diesel-powered Trucks ..... 99

**News and Illustrations**
Hints for Officials ..... 90

**Noise Nuisance**
A Help to the Anti-Noise Campaign ..... 97

**Outdoor Lighting**
Light, the City's Great Protector ..... 100
Lighting the George Westinghouse Bridge. 102
The Newark-Jersey City Viaduct and Its Lighting ..... 102
Color Floodlighting for St. Paul City Hall 102

**Parks and Recreation**
How Red Wing Was Given 232 Acres of Parks ..... 80

**Police**
Police Radio Systems ..... 19
Cooperation Between Police and Public.... 75

**Power Plants**
A Surface Water Supply in Alaska Also Furnishes Power ..... 9
Police and Public Cooperation ..... 75

**Publications**
Book and Pamphlet Notices ..... 87

**Public Works**
Self-Liquidating Loans Granted During December ..... 5
R. F. C. Reduces Its Interest Rates ..... 5
Self-Liquidating Projects to Be Accelerated 5
Fair Play in Paying for Improvements..... 71
Metallic Zinc Paint for Exposed Metal Surfaces ..... 90
Protecting Concrete from Impact ..... 91



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In THE MUNICIPAL INDEX (the annual reference volume of data and condensed catalogs published by the American City Magazine Corporation) readers will find much material, including lists, and articles on a wide variety of municipal and civic subjects, not published in the monthly issues of the magazine.



**Radio**
Police Radio Systems ..... 19
The New "You and Your Government" Radio Series ..... 53
Oklahoma Has Radio Talks on Government 86

**Sewers and Sewage Disposal**
Tacoma Employs 1,500 on Streets and Sewers ..... 13
Explosion Hazards in Manholes ..... 13
Visitors and Publicity ..... 13
Charges for Sewerage Service ..... 65
Metering Equipment at the New Easterly Sewage Treatment Works, Cleveland, O. 90

**Snow Removal**
A New Series of Hydraulic-Operated Snow-Plows ..... 91

**Street Cleaning**
Flushers Keep the Streets of Jackson Really Clean ..... 53

**Streets and Highways**
Road Officials Show Need of Continued Federal Aid ..... 5
Alley Pavement in Minneapolis ..... 11
Flexible Base Construction Using Emulsified Asphalt ..... 11
Street Maintenance Costs Cut One-Half... 47
Recent Developments in Brick Paving for Municipalities ..... 55
Bituminous Street Paving Has Provided Unemployment Relief at Low Cost in Austin, Texas ..... 67
A New 2-Ton Asphalt Pugmill Mixer.... 95
Bituminized-Cement Macadam Roads..... 95
A Black Top Paver ..... 97
A Bucket Loader with an Improved Feeding Device ..... 99

**Traffic**
New Traffic Safety Contest Begins This Month ..... 19
Traffic Control and Facilitation ..... 82
Detectors for Traffic Control ..... 93
A Reflecting Safety Island for Pedestrians. 99

**Unemployment Relief**
Tacoma Employs 1,500 on Streets and Sewers ..... 13
Bituminous Street Paving Has Provided Unemployment Relief at Low Cost in Austin, Texas ..... 67
How Red Wing Was Given 232 Acres of Parks ..... 80
County Adopts Efficient Work-Relief Plan. 81

**Waste Collection and Disposal**
Garbage Disposal in Various Places ..... 17
Garbage Collection Under Town Government in Brookline, Mass. ..... 76
A New Unit for Municipal Refuse Collection ..... 91

**Water Supply and Water Works**
Modernizing Water-Works Administration.. 7
The Origin of Color in Water ..... 7
Standpipe, Lancaster, Pa. ..... 7
Color Removal at Marshfield, Ore. ..... 9
A Surface Water Supply in Alaska Also Furnishes Power ..... 9
The New Hollywood Steel Pipe Line..... 9
Water Consumption in Newark, N. J.... 9
Correcting Trouble with Customers' Services ..... 50
Meter Registration and Water Revenue... 58
Water-Works Leak Detectors Perform Valiant Service ..... 97

**Who's Who**
In City and County Engineering ..... 15


*See pages 21, 22, 87, 88, for notices of catalogs and publications on municipal and civic subjects*

*For Index to Advertisements see page 110*

# WORLD'S LARGEST WATER DEVELOPERS

# LAYNE'S

# 50 Years

1883 - 1933

## OF ACHIEVEMENT

AND now Time's great hand begins to etch the record of Layne's 50th year.

¶ Behind lies a half century of ceaseless research . . . of fearless pioneering . . . *and, above all, of notable achievement.*

¶ Out of the vision and once single-handed labor of its founder, Layne has risen to unrivaled leadership as—

¶ "THE WORLD'S LARGEST WATER DEVELOPERS."

¶ In thousands of towns, cities and industries the world over—Layne Pumps set the standard for economy and efficiency.

¶ As yet Layne Well Water Systems are unmatched in maximum water production at minimum cost.

¶ And it is reasonable to believe that out of Layne's continued research in field and laboratory will come still greater developments—developments that will surpass even those of Layne's first 50 years of achievement.

¶ Detailed bulletins that are of special value and interest to all municipal officials will be sent to you without obligation. Address Department B, Layne & Bowler, Inc., Memphis, Tenn.

# LAYNE PUMPS
## AND WELL WATER SYSTEMS

# Spending and Building vs. Depression

### *Banishing the Depression More Urgent Than Balancing the Budget*

THAT the Federal Government neglect the sinking fund temporarily and add to the national debt as an aid to banishing the depression was advocated by some of the nation's most eminent economists at the Conference on Taxation and Public Finance conducted by New York University last month. On this subject the opinion of Professor Edwin R. A. Seligman, of Columbia University, is especially worth quoting:

"The question then is this: Is it worth while, in order to tide over what may be expected to be only a comparatively short interval, to introduce new, untried and complicated forms of taxation with the inevitable results in our business and general economic life? Would it not be preferable to treat the deficit of these lean years just as we treated the surplus of the fat years?

"In other words, just as we used the surplus in a large part to pay off our national debt at a rate considerably over and above the requirements of the sinking fund, so now we might, without fear of incurring substantial criticism, overcome the deficit by temporarily neglecting the sinking fund and adding to our debt. To utilize the national debt, whether for purposes of temporary surplus or of temporary deficit, is entirely legitimate. If correctly presented, such a method of financing ought not in the slightest degree to impair the national credit."

For the views of other eminent economists see pages 49 and 54.

### *Road Officials Show Need of Continued Federal Aid*

IMMEDIATE action by Congress in continuing the regular Federal-Aid road appropriations, so that the states may effectively continue their road construction and job-giving programs, was urged in resolutions adopted at the recent convention of the American Association of State Highway Officials.

The Association points out that authorizations for Federal Aid terminate with the fiscal year ending June 30, 1933. New appropriations must be made for the fiscal years 1934 and 1935.

Because of the large road task and the great numbers of workmen dependent on highway building, it is hoped that Congress will again make $125,000,000 available for roads for each of the fiscal years 1934 and 1935.

It is asserted that even with these annual appropriations the states will have less Federal money for roads than in 1932, because emergency Federal road advances and loans from the Reconstruction Finance Corporation must be repaid to the Federal Government from future Federal-Aid allotments. This can amount to $41,000,000 per year.

Facts cited to the Association by W. C. Markham, Executive Secretary, in his annual report show the need for continuance of Federal Aid on a large scale, not only because of road needs, but also because of employment. He states:

"Only 40 per cent of the roads on all the state highway systems had a dustless surface or better January 1, 1923.

"Only 99,538 miles of pavement were on all the state highway systems January 1, 1932, out of a total mileage of 347,867.

"Roughly speaking, 14 per cent of all roads are on the state highway systems, whereas 5 years ago state systems comprised 10 per cent of the total mileage. This growth in mileage has resulted in increased costs to the states.

"In August, 1932, an average road-building month, 333,000 men were employed in state highway work directly on the job, including Federal-Aid projects. This means that one out of every 367 persons in the United States was earning his livelihood through state road construction by direct work, while there were at least two men preparing and transporting material to the jobs, making in all at least 1,000,000 men given employment for state road work only. If for no other reason than the provision of jobs Federal Aid should be continued on its present basis."

### *R. F. C. Reduces Its Interest Rates*

ON December 24 the Reconstruction Finance Corporation announced a reduction of ½ of 1 per cent in its interest rates on all loans except those for emergency relief and for self-liquidating public works. In explanation of its new policy the Corporation pointed out that, while the rate to banks, insurance companies and other financial institutions has been 5½ per cent and to railroads 6 per cent, relief loans have been at the low rate of 3 per cent. As to public works projects, the statement said:

"The rate of interest on loans or contracts to aid in the financing of self-liquidating projects under Section 201 (a) of the Emergency Relief and Construction Act of 1932 will be established in connection with each loan application. However, if a borrower under this section of the law refinances all its loan or contract, or sells all its obligations held by the Corporation in connection therewith, during a period of two years from the date its loan or contract is authorized by the Corporation, on such a basis that the cost of the money to the borrower is lower than the cost of the money received from the Corporation, the borrower will be permitted, during such two years, to repay the Corporation on the same basis as to yield as that upon which the borrower refinances such loan or contract or sells such obligations, provided the return to the Corporation for the use of its money will not be less than the rate of 4 per cent per annum."

### *Self-Liquidating Projects to Be Accelerated*

ACCORDING to a United Press dispatch of December 27, acceleration of loans for self-liquidating public works projects is expected to result from the liberalized attitude of the Reconstruction Finance Corporation towards such loans.

"At present," says the dispatch, "140 construction loan applications totaling $293,500,000 are pending before the Corporation. Ninety-one of these applications, for sums amounting to $95,500,000, are considered to be in nearly final form. The remaining 49 still lack complete engineering, legal or financial details.

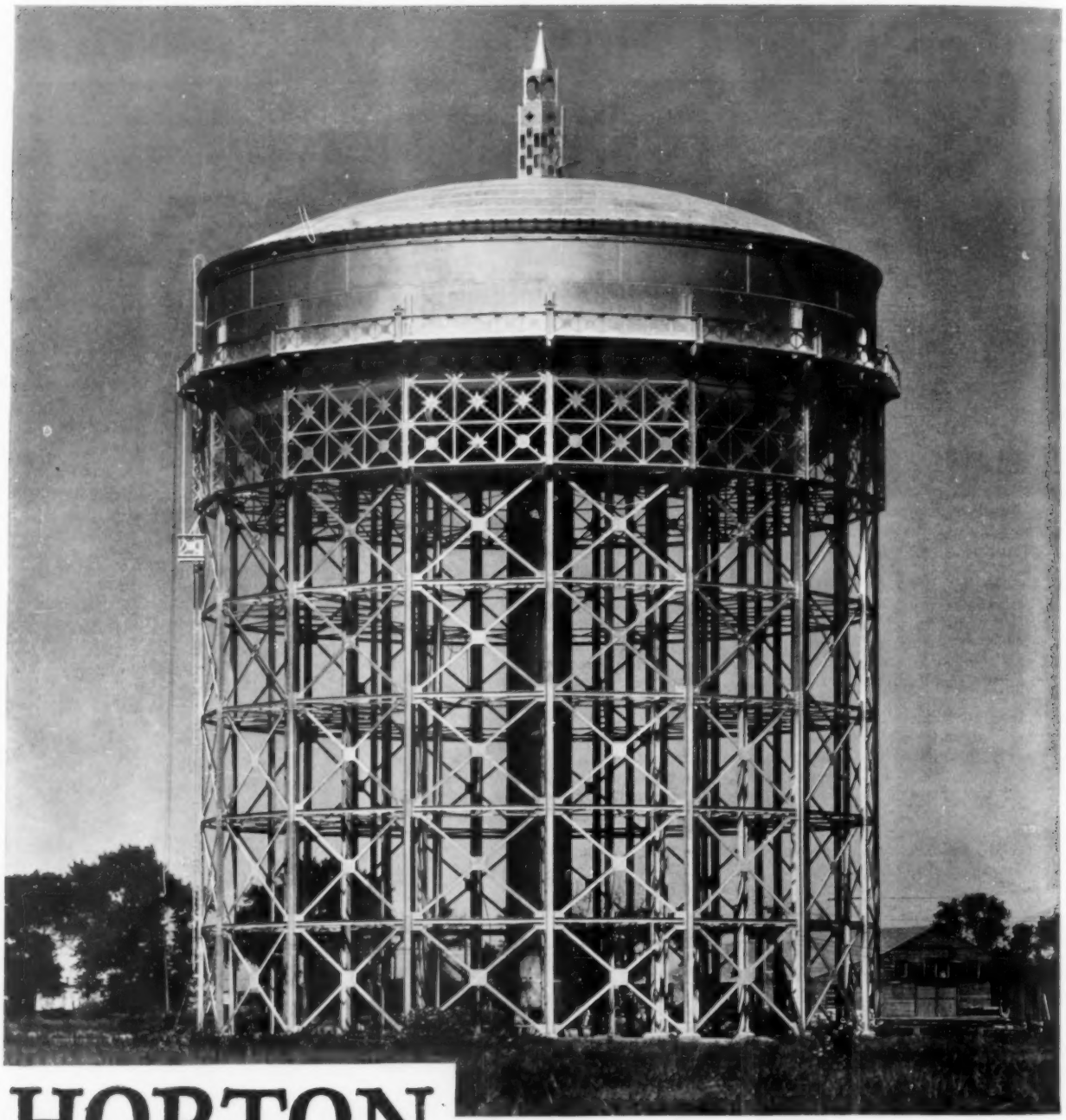
"The Corporation hopes that the reduced interest rates and an increase of self-liquidating loans will diminish the criticism that the Reconstruction Finance Corporation has failed to provide the maximum aid to business, agriculture and employment.

"Among the ninety-one projects for which loan applications are in the final stages of completion are thirty-nine water-supply systems, ten power plants, ten irrigation and flood-control systems, five sewer plants, four bridges and four docks."

### *Self-Liquidating Loans Granted During December*

THIRTY-seven loans, aggregating $139,394,500, by the Reconstruction Finance Corporation for self-liquidating projects have been reported on this page in the October, November and December issues of THE AMERICAN CITY. New loans authorized for such projects during December included:

| | |
|---|---|
| Tyler, Texas, additions to sewage disposal plant | $ 100,000 |
| San Diego, Calif., dam and pipe line | 2,350,000 |
| Winston-Salem, N. C., extension of sewerage system | 180,000 |
| Tybee Water Works, Savannah Beach, Ga. (a corporation), additions | 22,000 |
| Jonesboro, Ark., Arkansas State Agricultural and Mechanical College, new dormitories | 175,000 |
| St. Paul, Minn., Friedman Bros. Holding Co., public market | 150,000 |
| Newark, N. J., Newark Farm Produce Market, Inc., public market | 55,500 |
| Dallas, Texas, Dallas Farmers Public Market Co., public market | 187,500 |
| St. Francis Levee District, Arkansas, rights-of-way for levees | 500,000 |
| Chicago, Ill., additions to water-supply system | 2,327,000 |
| Saranac Lake, N. Y., new water mains | 8,000 |
| Corpus Christi, Texas, repairs to water-supply dam | 500,000 |



# HORTON

**TANKS of the radial-cone design are particularly economical because of the small variation in effective head. They also present a pleasing appearance without excessive ornamentation. The Evanston, Illinois, tank, illustrated above, has a capacity of 1,500,000 gallons and the total range in head is only 25 feet. Write our nearest office for information or estimating prices on elevated storage to meet your needs.**

## CHICAGO BRIDGE & IRON WORKS

| | | | |
|---|---|---|---|
| Chicago | 2127 Old Colony Bldg. | Dallas | 1206 Burt Bldg. |
| New York | 3108 Hudson Terminal Bldg. | San Francisco | 1033 Rialto Bldg. |
| Cleveland | 2236 Midland Bldg. | Seattle | 4343 Smith Tower |
| Detroit | 1501 Lafayette Bldg. | Houston | 2919 Main St. |
| Philadelphia | 2616 "1616" Walnut Street Bldg. | Tulsa | 1425 Philcade Bldg. |
| Boston | 1501 Consolidated Gas Bldg. | Los Angeles | 1403 Wm. Fox Bldg. |
| Birmingham | 1502 Fiftieth St., N. | Havana, Cuba | Apartado 2507 |

*Fabricating plants in CHICAGO, BIRMINGHAM, and GREENVILLE, PA.*

AC1-Gray

# Pure Water—Man's Greatest Need

## *Modernizing Water-Works Administration*

ON July 1, 1930, Cincinnati, Ohio, found itself operating with 39 meter readers reading an average of 150 accounts each per day. The readings were recorded upon individual field cards for the separate account. The field cards were returned to the office and then transferred to an office ledger card, after which the field cards were filed for the following month. The ledger card was then used as the basis for billing. The consumption was noted, together with the amount of the charge. The ledger cards were then passed to six billing machine operators, who turned out the bills. The bill was a one-stub bill which performed the function of a cashier's stub. It was carbonized on the back in order to permit the copying of the billing data upon ledger sheets prepared monthly for each round of billing. These sheets carried the folio numbers for all accounts, stamped by a numbering machine, the folio number being used to indicate the account.

All bills had to be addressographed previously and then matched up with their corresponding position on the ledger sheets. The billing was done on regular billing typewriters with non-adding facilities, so that at the conclusion of any billing unit it was necessary to add these sheets to arrive at the total consumption billed and the amount of accounts receivable. The billing period ran from the 1st to the 25th of each month, on which date the delivery of bills by meter readers began. As payments were received, the charges were posted to ledger sheets, and there was no proof of correct posting. The last date of payment was the 20th of the month. Because of the tremendous peak load of that date, it was impossible to mail delinquent notices before the ensuing month's bills were due for delivery. Delinquent bills were therefore mailed on the 10th of the following month for payment by the 15th, and this gave the office another peak load. On the 15th bills were prepared for the remaining unpaid accounts and given to turnkeys for collection or for shutting off the water.

It is obvious that this billing and collection procedure involved a good deal of duplication and was very costly. After some study it was decided to apply modern procedure to the problem. An inventory of the administrative division showed that there were 89 employees engaged in meter reading, posting of meter readings, commercial work, billing, collection and accounting. It was agreed to eliminate the transfer of meter readings from the field cards to the office cards, and to use field cards as a basis for billing. Meter books were substituted for field cards, and the program was arranged so as to transfer data from the former field cards to the meter sheets in loose-leaf binders. A quarterly meter-reading period was decided upon as standard, with the exception of large users, whose accounts are still read and billed monthly, and domestic consumers in the old part of the city, where leakages are heavy, who are billed quarterly but whose meters are read monthly.

The next step was to remodel the automatic addressograph and imprint upon our post-card bills the office records and delinquent notices as well. The Burroughs billing machines, which were on the floor, were revised in order to get rid of the ledger sheets and make the complete bill, accounting stub, and recapitulation sheet in one operation. This new procedure indicated that instead of the six machines that had been in operation earlier, two machines could be used for part-time operation. By September 15, the first group of bills were mailed under the stub plan and on a one-cent permit.

Again, the Department was faced with an excess of employees on general procedure. For the time being, these were used to complete the transfer of the records. By February 1, 1931, the new installation was complete, and it was found that work formerly done by 89 employees was being taken care of by 42. Because of the gradual changes in administrative procedure and the whole-hearted cooperation of the Civil Service authorities during the period from July 1 to February 1, it was possible to finish the transfer of the employees and find places for all without creating new positions in the city service.

It would be impossible to detail other features of the new installation, such as the electric envelope opener, the preparation of bank deposit sheets by the use of an electric check-endorsing machine, and the installation of money-changing machines and a postage-meter machine. In the application division, six copies of on-and-off orders are issued at one writing. Loose-leaf filing equipment has become standard. Meter records are kept in fireproof files, locked at night.

C. A. DYKSTRA,
City Manager, Cincinnati, Ohio.

## *The Origin of Color in Water*

ORGANIC matter in solution is prominently noticeable by taste, odor or color. The water may have any one or all of these qualities. Taste and odor due to organic decomposition and solution may be eliminated, in many cases, by chemical reagents. Color is not eliminated by the same treatment, being a complex derivative of totally different properties.

Where water comes in contact with fresh or newly grown vegetation, color solubility is at the lowest potential. The unoxidized or growing vegetation yields some organic oils, but color is not thereby visible. The oxidized vegetable decomposition which takes form after the period of bloom may be classified as alkaloids, organic anhydrides and acids. These are soluble to a marked degree in water. Chemical analysis reveals no relationship of importance between the amount of dissolved organic matter and the carbon dioxide content in natural streams. Nor is the color intensity necessarily a function of the amount of dissolved organic matter or the oxygen demand. Apparently, color is somewhat unrelated and is dependent on the class of color colloid present; much as black and green tea—the same quantity in the same concentration—yield marked differences in color intensity.

PAUL F. BOVARD,
California Filter Co., San Francisco, Calif.

## Items on Water Supply and Purification

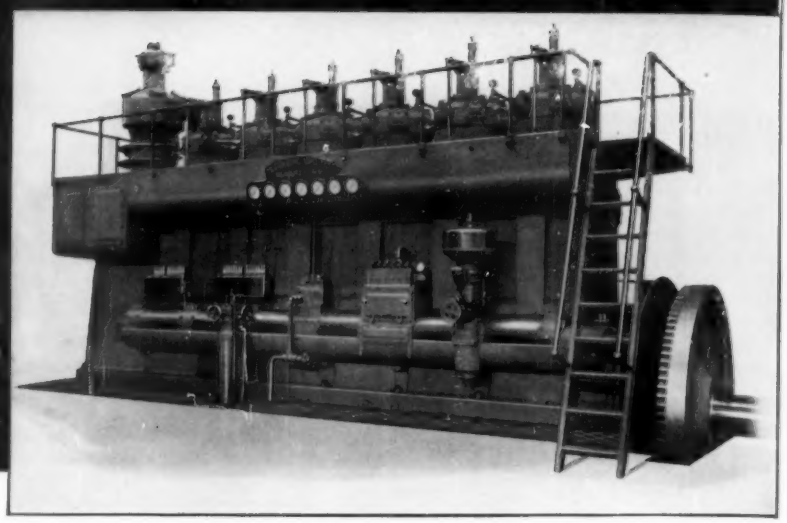
**Interested in Water Softening?** Read "Municipal Water Softening," pp. 314-318, The Municipal Index for 1932.

A NEW 5,000,000-GALLON STANDPIPE BUILT FOR THE CITY OF LANCASTER, PA.

The standpipe is 1,000 feet in diameter and 91 feet high, and weighs 875 tons. It was fabricated and erected in five months. The dome roof was erected on wooden pontoons on the inside-bottom of the tank and when completed was floated to its top position. Water was supplied through a 24-inch connection which raised the roof at a rate of about 18 inches per hour

# NORDBERG DIESEL ENGINES

*for*
**LOW COST POWER**
*from*
**LOW GRADE FUELS**



*This Nordberg two-cycle, air injection engine is particularly suited for the use of heavy fuels. This engine is also built with mechanical injection for use of the lighter oils.*

Fuel is a major item of expense in producing power. A low fuel cost means a lower power cost and the engine that efficiently utilizes the cheaper fuels is certain to be found among the low cost producers.

In many such plants, Nordberg Diesels are in service and are returning substantial profits to their owners. Down at the Panama Canal, three 4,000-horsepower engines are running on heavy Bunker "C" oil. Fuels as heavy as 10° Baume are being used in other installations with equal success.

If you are looking for an engine that will produce power at a lower cost, a unit with long life and low maintenance expense and one that will give more dependable service, choose a Nordberg Diesel. They are built for those who appreciate quality in engine design and construction.

**TO MUNICIPAL OFFICIALS**

The large number of Nordberg Diesels in municipal service and the performance records back of them, is ample evidence of what these engines will do in such an important application. With the tendency today more and more toward municipal ownership of utilities, where a new plant is being considered or an addition being made to the existing one, municipal officials will find it advantageous to discuss their power problem with a Nordberg Representative.

**NORDBERG MFG. CO., Milwaukee, Wis.**

# NORDBERG

# Pure Water—Man's Greatest Need

## Items on Water Supply and Purification

### *Color Removal at Marshfield, Ore.*

THE problem of clarification of the domestic water supply at Marshfield, Ore., is interesting in that the high color was objectionable in the domestic water supply. In addition, the water was corrosive, augmenting the natural color with red oxide of iron. No less important was the destructive action on the water mains and industrial pipe lines. Pony Creek, the source of water supply, is a stream with a very limited drainage area, depending largely on heavy rainfall, with no major tributaries. The drainage area is heavily forested, and its surface is deeply matted with mold and forest products under decomposition. Daily reading of color over a period of years showed a very high average, one month running as high as 140, which indicates a strong, tea-like, dark-brown color.

In 1925, the water company requested a report on possible means of clarification. Experiments were conducted, taking as a basis an average water sample from Pony Creek showing a color of 140. It was found that, using 1.73 grains of aluminum sulphate and 0.06-grain of lime, as calcium hydroxide, the best and most efficient clarification was obtained at a pH of 5.2. The original sample showed a pH of 6.4. In a period of one hour's settling, the color of the filtered water had dropped to less than 3. It was also found that the alum could be raised to 2.2 grains per gallon and the lime to 0.07-grain per gallon, which gave a clarified effluent with a pH of 5.3.

Owing to the fact that this supply carried no turbidity, the resulting floc was not heavy enough to settle out readily. Therefore, the filtration plant was designed to take care of any floc which might remain in suspension after four hours of sedimentation.

KENNETH SHIBLEY,
California Filter Co., Seattle, Wash.

### *A Surface Water Supply in Alaska Also Furnishes Power*

A WATER supply for Ketchikan, Alaska, furnished by the Citizens Light, Power & Water Co., is secured from Ketchikan Lake, the combined upper and lower lakes forming an impounding reservoir of 580 acres, with a total watershed of 5,300 acres. These lakes are 7,800 feet from the city and furnish a pressure of 110 pounds at the power house, or 120 pounds on the fire main. The regular or domestic pressure varies from 60 to 80 pounds in the city. The spillway of the lake is 342 feet above sea level. The power house which is used to develop electric power from the water in these lakes is equipped with apparatus to produce 4,000 horsepower.

AXEL CARLSON,
Superintendent, Water Works.

### *The New Hollywood Steel Pipe Line*

CARRYING water under water is the purpose of the new Hollywood, Calif., steel pipe line. When the Los Angeles Department of Water and Power decided to build a second dam above the present Mulholland Dam at Hollywood, it was necessary to lay a pipe line from the bottom of the new reservoir through the dam, along the bed of the first reservoir and down through the canyon, where it will connect with the city mains. This welded pipe line, 45 inches in diameter and 3,460 feet in length, will be submerged under 50 feet of water when the project is completed. Slip joints were used and shield-arc welded to secure a continuous leak-proof line.

PART OF LOWER KETCHIKAN LAKE

## Water Consumption in Newark, N. J.

| Year | Average Daily Consumption Newark and Suburbs, Million Gal. | Average Daily Consumption in Newark, Million Gal. | Per Cent of Services Metered in City | Gallons per Day per Inhabitant in City | Percentage of Water Used Metered: By other Municipalities | In Mills, Factories and Railroads | Semi-public Schools, Hospitals, Churches, etc. | Commercial Stores, Stables, Office Buildings | Domestic | Unmetered and Unaccounted for | Number of Services in Use in City |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1914..... | 43.0 | 42.3 | 58.80 | 110.40 | 1.7 | 17.7 | 1.8 | 6.6 | 19.3 | 52.9 | 46,697 |
| 1915..... | 42.4 | 41.7 | 60.60 | 110.00 | 1.6 | 19.1 | 2.4 | 7.4 | 20.9 | 48.6 | 47,308 |
| 1916..... | 47.2 | 46.5 | 64.80 | 116.00 | 1.5 | 26.7 | 2.2 | 6.6 | 20.2 | 42.8 | 47,769 |
| 1917..... | 46.3 | 45.6 | 88.05 | 113.00 | 1.5 | 29.8 | 2.3 | 7.3 | 28.6 | 30.5 | 48,158 |
| 1918..... | 50.2 | 47.8 | 89.89 | 111.00 | 4.7 | 29.2 | 2.3 | 6.8 | 27.4 | 29.5 | 48,402 |
| 1919..... | 45.3 | 43.4 | 90.65 | 104.00 | 4.1 | 31.6 | 3.0 | 8.2 | 29.9 | 23.1 | 48,840 |
| 1920..... | 48.3 | 45.7 | 92.17 | 110.00 | 5.4 | 29.1 | 2.9 | 8.2 | 29.7 | 24.7 | 49,356 |
| 1921..... | 42.3 | 39.9 | 92.73 | 92.00 | 5.8 | 26.1 | 3.9 | 8.2 | 33.7 | 22.3 | 50,092 |
| 1922..... | 44.9 | 42.6 | 93.87 | 99.00 | 5.2 | 27.3 | 3.4 | 8.1 | 33.5 | 22.5 | 50,652 |
| 1923..... | 47.9 | 44.7 | 94.32 | 102.00 | 6.6 | 29.1 | 3.0 | 8.3 | 31.5 | 21.5 | 51,978 |
| 1924..... | 50.2 | 45.0 | 95.15 | 100.10 | 10.5 | 24.9 | 3.1 | 8.1 | 30.7 | 22.7 | 53,291 |
| 1925..... | 52.0 | 45.5 | 95.26 | 100.22 | 12.5 | 29.3 | 3.2 | 7.7 | 31.3 | 16.0 | 54,896 |
| 1926..... | 54.3 | 46.1 | 95.61 | 100.22 | 15.2 | 28.0 | 3.5 | 9.4 | 31.6 | 12.3 | 56,232 |
| 1927..... | 55.6 | 46.1 | 95.6 | 97.26 | 17.0 | | 69.1 Not subdivided | | | 13.9 | *57,695 |
| 1928..... | 56.7 | 48.1 | 97.0 | 100.21 | 15.2 | 25.5 | 3.4 | 10.2 | 31.8 | 13.9 | 58,315 |
| 1929..... | 59.1 | 50.4 | 96.8 | 103.92 | 14.7 | 27.2 | 3.8 | 9.7 | 31.6 | 13.0 | 58,769 |
| 1930..... | 57.7 | 50.0 | 96.8 | 113.64 | 13.6 | 25.7 | 4.5 | 9.6 | 33.3 | 13.3 | 59,075 |
| 1931..... | 52.5 | 45.8 | 97.2 | 102.92 | 12.8 | 24.2 | 4.3 | 10.5 | 35.8 | 12.4 | 59,200 |

* Including high pressure connections for 1927 and thereafter.

# Could Your City Use More Revenue?

A modernized system of tax equalization will produce these results. Statistics prove that scores of municipalities have actually secured—

—greater municipal credit
—more actual revenue
—earlier and easier collection of tax money
—greater attraction for new industries and businesses
—tax reductions for 60% of their property owners
—stationary taxes for 20% of their property owners
—increased taxes for only 20% of their property owners

The Thomas Valuation Bureau System is a refinement of former tax equalization methods. By the previously accepted methods the group of nine companies sponsoring the Thomas Valuation Bureau have satisfactorily equalized the taxes in numerous communities.

The Thomas Valuation Bureau System results in the following:

Installation of the most modern and most efficient system of equalized property revaluation.
A thorough training of the assessors in the science of modern engineering appraisal.
The greater part of the cost of equalization is expended within the municipality—to townspeople, not to outside engineers.
A complete and efficient set of tax maps.
The service when once installed becomes a system in perpetuity.
A better financing of the community.

THOMAS Valuation BUREAU INC.

EXECUTIVE OFFICES 4411 RAVENSWOOD AVENUE CHICAGO

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**For Additional Information**

If you will furnish us with the following approximate figures, we will give you costs and financing plan at no obligation to you or your community.

Factory Buildings ..... Stores .....

Building Plots ..... Residences .....

Area of Your Municipality .....

Your Name .....

Official Position .....

City and State .....

**Important**

To those municipalities which are in financial difficulties and unable to appropriate funds for scientific revaluation we offer a solution through our Financing Department.

# Construction and Maintenance

**Engineering and Highway Departments**

## *Alley Pavement in Minneapolis*

MUNICIPAL officials favor alley pavements because they improve the city's appearance, are more sanitary, reduce maintenance costs and increase the efficiency of garbage removal. Minneapolis has developed unique methods for persuading property owners to petition for alleys. These methods are so successful that in 1932, with municipal construction almost at a standstill, more alleys have been paved than in any previous year.

The first step was assigning a man in the City Engineer's office to the promotion of alley pavements. Conditions this year made it impossible to carry on the work of alley maintenance, leaving them in very bad condition. This led to complaints by property owners, especially in wet weather, concerning the condition of some particular alley.

When a complaint comes in, it is turned over to the man in charge of alley promotion, and he writes the complainant a letter explaining that the city has no funds for alley maintenance and that the only chance for relief is to persuade others abutting on the alley to petition for pavement. Literature extolling the advantages of alley pavement is included, and information on the probable cost.

A blank petition for alley pavement is also sent to the complainant with the explanation that the signatures of 51 per cent of the property owners are required to secure a paved alley, and the suggestion that he persuade others to sign. If the petition is not returned with the necessary signatures within a reasonable time, the alley man goes out in the field and himself attempts to secure the necessary signers, but this is not often necessary.

The success of alley promotion is indicated in the following table of alley yardages:

YARDAGE OF CONCRETE PAVEMENT BUILT IN MINNEAPOLIS ALLEYS

| *Year* | *Square Yards* |
|---|---|
| 1922 | 10,227 |
| 1923 | 19,606 |
| 1924 | 11,720 |
| 1925 | 11,658 |
| 1926 | 15,106 |
| 1927 | 54,747 |
| 1928 | 43,390 |
| 1929 | 54,844 |
| 1930 | 62,557 |
| 1931 | 28,812 |

From 1922 to 1926 no real effort was made to promote alley pavement, and property owners were not fully acquainted with the advantages of paved alleys nor the procedure required to secure them. In 1927 funds for alley maintenance were extremely scarce. So a bureau of complaints was established, and persons filing complaints against alleys were urged to pave immediately. That was a wet year, and the result was three times as much alley pavement as in previous years. The same arrangement was continued until 1929, when the plan already described was inaugurated, with results as indicated in the table. During 1932 concrete pavement was petitioned for for 138 alleys.

In Minneapolis the cost of alley pavement is assessed against abutting property, and may be paid over a period of five years. Alley pavements are 12 to 16 feet wide, and the average cost for such pavement along a 40-foot lot is $60.

## *Flexible Base Construction Using Emulsified Asphalt*

BY the use of emulsified asphalt, the park authorities of Washington, D. C., were able to undertake economically and successfully the construction of a flexible base for a bituminous concrete surface, instead of the rigid or semi-rigid type of base which has been used in the past. The method of construction consisted of thoroughly consolidating the subgrade and placing thereon a 5-inch course of crushed stone. After compaction this stone course was choked with clean slag screenings and stabilized by the application of quick-breaking emulsified asphalt, followed by additional choking material and a second application of asphalt emulsion. The finished job was sufficiently stable to withstand trucking prior to the placing of the bituminous concrete surfacing. On one occasion a steam shovel was moved over a section of freshly laid base under its own power, but without disturbing the base course in any way. On another occasion, a 70-ton load was taken over a section of the completed roadway, again without any damage being noticeable.

As the work was carried out during a season of the year when bad weather usually prevails, the use of Colas asphalt emulsion insured the job against the extended delays normally experienced during wet weather. It was possible to use the base almost immediately, owing to the quick-setting properties of the emulsified asphalt. The wisdom of using this type of base construction has been demonstrated recently, when heavy rains have undermined the pavement in a number of places. The base has settled in each instance, but without cracking, and it will be a quite simple matter to repair these depressions. If a rigid base had been used, serious damage to the paving would have resulted from the washouts.

FRANK T. GARTSIDE,
Engineer, Parks Division, Department of Public Buildings and Public Parks, Washington, D. C.

## *Buffalo Has A-1-A Airport*

THE Aviation Division of the United States Department of Commerce has awarded the Buffalo municipal airport the government A-1-A rating. This field is the only one in New York State so rated, and there are only ten in the entire country which carry this rating. Two hundred acres of landing surface, a 6,000-foot runway, modern flood-lighting equipment, a special fire truck, and a hospital ambulance and first-aid room, are features of the Buffalo airport.

NATHANIEL E. DUFFY,
Director, Buffalo Municipal Airport.

A PICTURESQUE ROADWAY IN WASHINGTON, D. C., CONSTRUCTED WITH AN EMULSIFIED ASPHALT-BOUND BASE
Photograph through the courtesy of the Office of Public Buildings and Public Parks of the National Capital

# LIFTS

## FROM ITS PROTECTION CASE

●

**This perfect miniature of a Mathews Modernized Hydrant shows that the entire mechanism is contained in a barrel which screws into a bronze-bushed elbow. It can be removed without disturbing the elbow or protection case. The large threads (4 to the inch) never strip and never leak.**

**Its advantages are evident. Repairs and replacements are quick and cheap. Inspections can cover the entire hydrant. Grade-changes are made at small cost. Streets need never be dug up. Fire protection need never be sacrificed for more than half an hour. • • You owe to your town the protection and economy of Mathews Modernized Hydrants. Write for a catalog and complete description.**

**SAND SPUN (Centrifugally cast) AND PIT CAST PIPE, GATE VALVES AND VALVE BOXES**
Reg. U. S. Pat. Off.

● **R·D·WOOD & CO·** 400 CHESTNUT STREET PHILADELPHIA
ESTABLISHED IN 1803

# Sewage Treatment Means Clean Streams

**SEWERAGE and SEWAGE DISPOSAL**

## *Tacoma Employs 1,500 on Streets and Sewers*

TAKING an early start to furnish employment this year, Tacoma, Wash., appropriated $90,000 to build needed sewers and to widen and pave certain important street intersections. Over 500 men were given work immediately, and the number is being increased to 1,500 with their employment staggered so that all will not be working at the same time. For the sewer work, the city has purchased over 4 miles of concrete pipe, 8 to 24 inches in diameter, and is building all-concrete manholes.

## *Explosion Hazards in Manholes*

A SURVEY of explosion hazards in manholes owned by the Edison Electric Illuminating Co. in the city of Boston, Mass., and 29 other contiguous towns was completed during the year 1931 and is made available to the public in U. S. Bureau of Mines Report of Investigations 3192. The survey was made by the Edison Electric Illuminating Co. and the Consolidated Gas Co., both of Boston, in cooperation with the U. S. Bureau of Mines and was conducted along the same general lines as a similar survey in Boston during 1929-30. Experiences in the first survey warranted a few improvements in test procedure, which include a test car designed especially for the work, and particular attention was paid to the protection of the men from traffic hazards. The charcoal filter test was added as a standard for procedure for further testing of manhole atmospheres that when tested with a detector in the usual way showed combustibles to be present.

The survey during 1931 extended over a greater territory and a far greater number of manholes were tested than during the 1929-30 survey. In 1931 a total of 9,210 different manholes were tested and 13,068 individual tests made. The tests made during 1929-30 showed that 6.2 per cent of the manholes tested gave indications of combustibles at one time or another during the year, while in the present survey only 2.7 per cent were found in a similar condition—a marked improvement. The composition of the constituents present in manhole atmospheres that showed combustibles varied over the following range:

| | *Per Cent by Volume* |
|---|---|
| Carbon dioxide | 0.0 to 16.6 |
| Illuminants | 0.0 to 3.9 |
| Oxygen | 1.0 to 20.5 |
| Hydrogen | 0.0 to 20.5 |
| Carbon monoxide | 0.0 to 3.8 |
| Methane-ethane | 0.1 to 34.7 |
| Gasoline vapor | 0.0 to 0.6 |
| Nitrogen | 30.6 to 83.7 |

The majority of the samples showed carbon dioxide to be present, and many showed proportions that would have been fatal to workmen had they entered the manholes without being properly protected. Likewise, many samples were found to be low in oxygen content; some, in fact, were so low that unprotected workmen in such atmospheres would have been quickly overcome. Records were kept relative to the barometric changes during the survey to determine whether such changes affected in any way the tendency of gases to accumulate in manholes. The results obtained during the 1931 survey indicated that the tendency for combustibles to accumulate in manholes is greater when the barometer is stationary than when the barometer is rapidly rising or falling. Tabulations to determine the time of year when combustibles are most liable to accumulate in manholes showed that the greatest number of manholes with combustibles was found during July. The next highest number for any given month was that of February.

A general survey of the constituents present in manhole atmospheres showed three kinds of contaminations:

1. Gases containing hydrogen, carbon monoxide, illuminants, methane, and ethane.—Because of the presence of hydrogen and carbon monoxide and of other constituents given above, these contaminations usually proved to be manufactured gas, which found its way into manholes from leaks in gas mains or services and from other sources.

2. Gases containing abnormally high percentages of carbon dioxide, varying amounts of methane, and low percentages of oxygen.—These mixtures usually offered no special hazards from explosions. The most of them were found to be non-explosive when air or when combustible propane gas was added. In the past these mixtures have been termed sewer gas for the want of a better name and because such mixtures were often found in sewer atmospheres. In this report these mixtures have been termed soil gases, because from the results obtained in this investigation such gases appeared to be the reaction products between normal air and oxidizable constituents in the soil. Many of the mixtures contained rather large percentages of methane as the result of fermentation or decomposition products of organic material in the soil.

3. A few of the samples showed the presence of heavy hydrocarbon vapors.—When heavy hydrocarbon vapors were found in manhole atmospheres, they were always associated with other combustibles such as those from manufactured gas or soil gas, and in no cases were these vapors present in amounts sufficient to produce explosive mixtures.

Contamination from more than one source was found in most of the samples analyzed, so that usually there was no sharp dividing line between the classes.

## *Visitors, and Publicity for Sewage Treatment Plants*

A SEWAGE treatment plant superintendent should encourage visitors to his plant. The plant must first be put in proper operating condition and made attractive; then you are ready to invite Mr. and Mrs. Average Citizen to visit this, their own public utility.

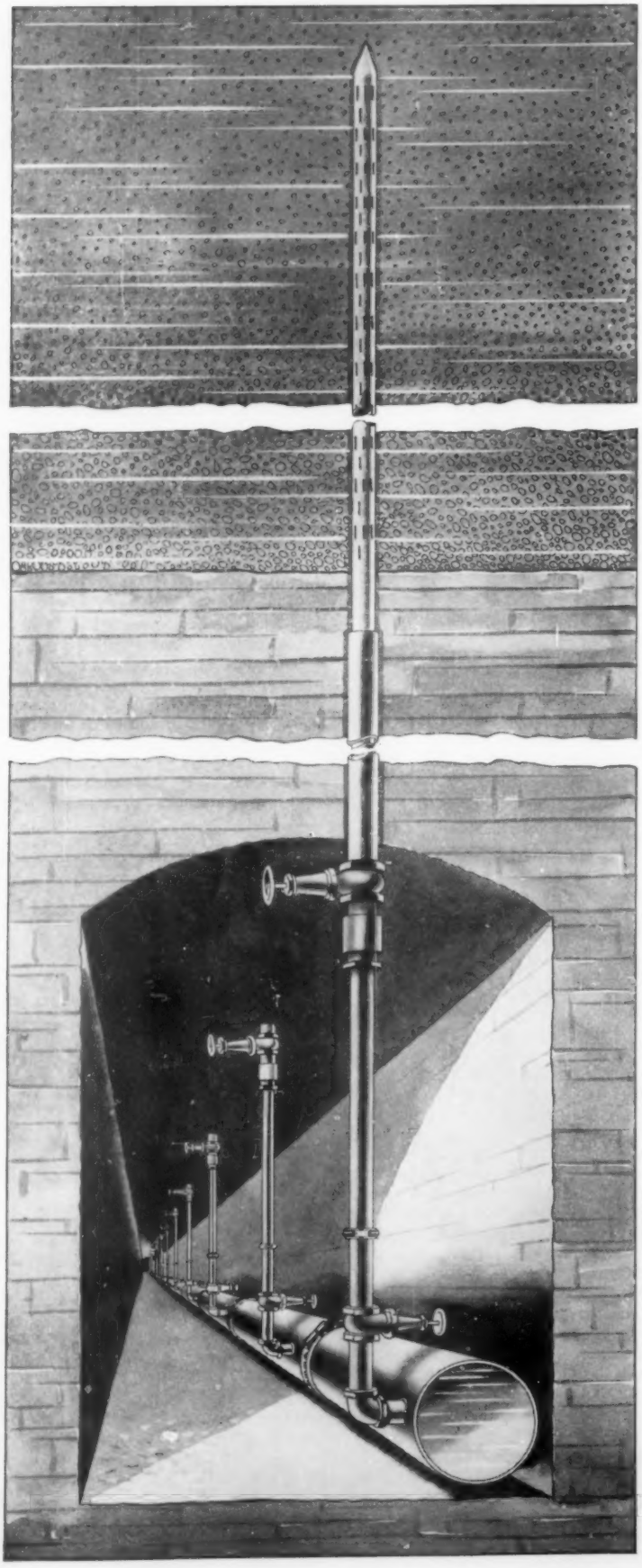
It has often been said that the less a man knows, the more he kicks. A person fears and criticizes what he does not understand. Because sewage treatment is here as a permanent necessity, it must be adequately supported and financed. The citizen stockholder who really pays the bills must be informed as to the why and wherefore of the plant. His interest must be aroused, his reason satisfied and his approval secured.

It is therefore the part of wisdom to encourage visitors at the plant. A visitor will appreciate the importance and complexity of this utility when he has been courteously received and given a short but interesting and informative trip about the plant. He will leave with some understanding of the processes, a new appreciation of its problems, and a respect for those charged with its management.

Another important phase in placing the plant favorably in the public eye has to do with even more direct publicity. The average city official is interested in the sewage works or should be. It is one of the public utilties with whose supervision he is charged. He really likes to know what is going on. Tell him of your work, your achievements and your problems. If he is acquainted with you and the work and needs of the plant, he is much more likely to support you when equipment or improvements are requested.

The plant operator may be a friend of the editor of the local paper. He may know one of the reporters. They are always looking for news and may be able to dramatize very effectively the story of the plant, its complex processes and spectacular operating features, the large Sunday group of visitors or the out-of-town expert who dropped in to inspect the plant.

—From a paper presented before the Iowa Sewage Treatment Conference, Iowa State College, Ames, Iowa, by Lindon J. Murphy, Municipal Engineer, Engineering Extension Service, Iowa State College, Ames, Iowa.



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## You Can Get

# VOLUME

## of Underground Water

Most cities have a huge potential underground water supply.

This is now made available by the Water Mine — the new, scientific, patented method of producing water.

From one shaft the Water Mine drills any required number of mine wells into the water sand, **from beneath, across** the line of flow. From an adequate water sand, any desired volume can be obtained. Installation and production costs are amazingly low. The supply is permanent and dependable. Consult . . . .

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West of Mississippi
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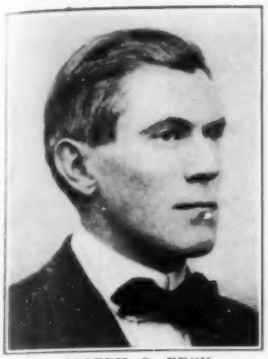
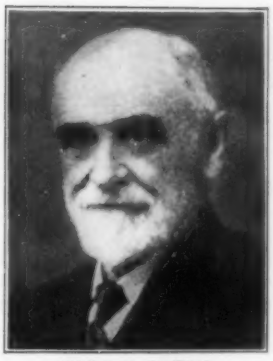
A WATER MINE LASTS 100 YEARS



JOSEPH C. PECK
City Engineer
Haverstraw, N. Y.
(Appointed 1930)

BURTIS P. THOMAS
City Civil Engineer
La Porte, Ind.
(Appointed 1918)



ALLEN B. DOWNS
Town Engr. and Supt. of Sewers
Lebanon, N. H.
(Appointed 1890)

H. G. SOURS
County Engr., Summit Co.
Akron, Ohio
(Elected 1924)

RALPH D. AUSTIN
City Engineer
Little Falls, N. Y.
(Appointed 1926)

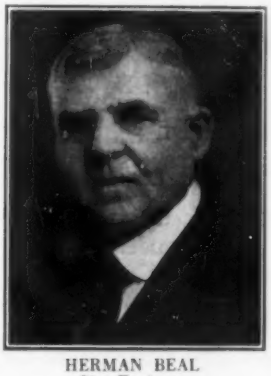
# Who's Who in City & County Engineering

***One of a Series of Portraits of Engineering Officials Which Has Appeared Monthly Since April, 1928***

N. R. KINNEY
City Engineer
Lexington, N. C.
(Appointed 1922)

DONALD H. LESSIG
City Engineer
Warsaw, Ind.
(Appointed 1925)

C. L. WATKINS
City Engineer
Roanoke, Va.
(Appointed 1922)



HERMAN BEAL
City Engineer
Omaha, Nebr.
(Appointed 1921)

CECIL R. LEAVENS
County Surveyor, Marion Co.
Marion, Ohio
(Elected 1922)

WILLIAM W. McLENDON
City Engineer
Corsicana, Texas
(Appointed 1932)

GEORGE H. RUSSELL
County Engr., Baca Co.
Springfield, Colo.
(Appointed 1927)

HARRY G. POWELL
County Engr., Canadian Co.
El Reno, Okla.
(Appointed 1915)

GEORGE C. STANLEY
City Engineer
Burlington, Vt.
(Appointed 1920)

# City of Hamilton, Ont., Canada
# Buys 10 International Trucks
# *for* New Garbage Disposal Project

HAMILTON, Ont., Canada, is under way with a new, efficient modern garbage disposal project that promises to solve the garbage problem for this city. The central feature of the project is the incinerator plant, the design and construction of which permits new standards of economy in garbage disposal.

New economies are also assured in the collection and haulage of the city's garbage. This work is entrusted to 10 International Model A-4 Trucks fitted with special garbage bodies of 5 cubic yards capacity. The fleet is shown above on the dumping platform of the plant. These trucks are hauling three times the tonnage of garbage per week as compared with the old method of collection, and are effecting a saving of 40% in cost of operation.

Other communities anxious to reduce municipal hauling costs can profit by following Hamilton's example. International Trucks have repeatedly proved their thriftiness in municipal and industrial service. The nearest of 188 Company-owned branches in the United States and Canada, or an International Truck dealer, will show you cost data on the various models and invite you to compare these figures with the operating costs of any or all other trucks of similar size and capacity.

***Catalogs, specifications, prices, and other data will be sent on request.***

INTERNATIONAL HARVESTER CO.
OF AMERICA
(Incorporated)

606 So. Michigan Avenue — Chicago, Illinois

**INTERNATIONAL TRUCKS**

# METHODS and COSTS of REFUSE COLLECTION and DISPOSAL

### *Boston, Mass.*

Collection of garbage in the city of Boston, population 781,188, is handled by a contractor and also by municipal forces. The city uses forty 2-cubic-yard wagons and twenty-three 8-cubic-yard trucks. The garbage is disposed of by reduction on an island in Boston harbor. —D. J. LYNCH, Assistant Division Engineer, Public Works Department, Sanitary Service.

### *Franklin, Mass.*

The town of Franklin, population 7,028, issues licenses at $1 each to garbage collectors who pick up the garbage through the town for use as feed for their hogs; thus the cost of collection in the town is nothing, and the town receives the license fees. In this service there are two ½-ton wagons and two 1½-ton motor trucks.—RUSS W. HARDING, Health Officer.

### *Gardner, Mass.*

An annual contract is awarded to one individual for the collection of the garbage of the city of Gardner, population 19,399. One motor truck of 2½-ton capacity with a special body is used for collection. The garbage is disposed of by feeding to hogs.—VICTOR WISHIKAINEN, Garbage Collector.

### *Hingham, Mass.*

Several parties collect garbage in Hingham, population 6,657, using horse-drawn vehicles with large cans or old-fashioned manure carts. As the taxpayers fear an increased tax rate, they are content to continue the individual system of disposal. There is a standard charge of $1 a month to collect garbage, hence many householders feed it to their hens or dump or bury it on their own property, increasing the fly nuisance. —MAYO TOLMAN, Secretary, Hingham Board of Health.

### *Lexington, Mass.*

A contract is awarded to one individual in Lexington, population 9,467, for the collection of garbage. He uses two motor trucks with 3-cubic-yard bodies and disposes of the garbage outside the town by feeding to hogs.—WILLIAM S. SCAMMAN, Superintendent of Public Works.

### *Lynn, Mass.*

The city of Lynn, population 102,320, has both municipal and contract collection. The garbage is disposed of by selling to farmers, thus creating a small revenue to partially pay for collection. The city has five Collecto type garbage trucks in service.—BOARD OF HEALTH.

### *Maynard, Mass.*

The city of Maynard, population 7,156, awards a contract annually to one individual for the collection of garbage throughout the city. The contractor uses three 1½-ton trucks for collection and disposes of the garbage by feeding to pigs.—H. ANDERSON, Contractor.

### *Quincy, Mass.*

Municipal collection is in force in Quincy, population 71,983. The city uses three 1½-yard wagons and eight 2½-yard motor trucks for collection. The garbage is sold to farmers and hauled out of the city. Rubbish is collected in three 5-yard trucks and two 12-yard trucks.—FREDERICK E. TUPPER, Commissioner of Public Works.

### *Shrewsbury, Mass.*

One individual has a three-year contract for the collection of the garbage in Shrewsbury, population 6,910. The contractor uses a 2½-ton motor truck and disposes of the garbage by feeding to hogs.—STANLEY M. BAILEY, Selectman.

### *Somerville, Mass.*

The city of Somerville, population 103,908, awarded an annual contract to one individual for the collection of garbage throughout the city. This contractor uses twelve 2-horse and two 1-horse wagons for collection and disposes of the garbage by selling it to piggeries.

### *Southbridge, Mass.*

The town of Southbridge, population 14,264, uses two 1-horse wagons for the collection of garbage throughout the city. The garbage is disposed of by feeding to swine.—ALBERT P. BROWN, Agent, Board of Health.

### *Uxbridge, Mass.*

No arrangements are made by the city of Uxbridge, population 6,285, for the removal of garbage from the various properties throughout the city. All collection is handled by farmers, who use the garbage for feeding to hogs.—PATRICK CARMODY, Chief of Police.

### *Waltham, Mass.*

The city of Waltham, population 40,000, has a complete Sanitary Department for the collection of garbage. The collection equipment includes four horse-drawn Holzbog sanitary garbage carts, two Autocar trucks and one Ford truck. The carts have a capacity of 54 cubic feet each, the Autocars 4 cubic yards, and the Ford truck 1½ cubic yards. The horse-drawn garbage carts cover routes in the thickly settled residential areas, while the trucks cover routes in the outlying residential areas, together with business and industrial areas. The garbage is hauled by the carts to a sanitary dumping platform, centrally located in the area collected, where it is dumped directly into the farmers' trucks. The collection trucks haul directly to a platform at the farm where the garbage is used. The farmers bid for the contract for taking the garbage from the city for a period of two years. They dispose of it by feeding to pigs on the northern outskirts of the city—HENRY F. BEAL, Director of Public Works.

### *Weymouth, Mass.*

The town of Weymouth, population 20,882, pays a contractor $11,000 a year for the removal of garbage from all property. The contractor uses two 3-yard motor trucks for this purpose and disposes of the garbage by feeding to hogs.—JOHN F. DWYER, Dwyer Bros., Contractors.

### *Battle Creek, Mich.*

Garbage in Battle Creek, population 43,573, is collected by the Battle Creek Garbage Co., which is paid by the individual householders. The contractor uses seventeen motor trucks and seventeen trailers. Platforms are built on the trailers, 20 feet long and 8 feet wide, to hold the cans collected from the householders. The collection company furnishes all the cans for garbage, ashes and rubbish, exchanging them twice a week when the collections are made. The cans are carried direct from the houses to the dump and are not emptied on the public thoroughfares.—CHARLES H. SCULLY, Manager, Battle Creek Garbage Co.

### *Bay City, Mich.*

The city of Bay City, population 47,355, has awarded a three-year contract to the Bay City Sanitary Garbage Co., giving this company the exclusive right to collect garbage throughout the city. The collector has installed a can-washing system, so that the householder gets a clean can twice a week in summer and once in winter when the garbage is removed; this is a very satisfactory method for the customer. Once a month the contractor picks up tin cans, bottles, crockery, etc., and he charges the customer $1 per month for all collections. The collection equipment consists of six trucks, including two 1-ton Chevrolets and four 2-ton Reo trucks with 6 x 12 racks in which the Rochester cans are carried five and six high.—CLINTON C. HILL, Manager, Bay City Sanitary Garbage Co.

# CLEVELAND'S *Famous* LANDMARK *now protected by a* GAMEWELL SPRINKLER WATCHMAN

*Over six hundred sprinkler heads in this famous Old Stone Church, Cleveland, Ohio, known as "The Hundred-Year Church," are supervised by a Gamewell Master type fire alarm box. Should a sprinkler head open for a fire, the fire alarm box would automatically transmit an alarm direct to the Cleveland municipal fire department.*

● ● ●

This famous old landmark, nestling in the heart of downtown Cleveland, has been thrice visited by fire. In 1857, twenty-five years after it was built, the church was razed by fire. Again in 1884 and 1931, fire destroyed portions of it.

Following the last fire, the pastor took every precaution to protect it from future destruction. A sprinkler installation was completed in August, 1932, and immediately the system was hooked up to a Gamewell SPRINKLER WATCHMAN (a Gamewell master fire alarm box), which in turn is connected up to the Cleveland fire alarm headquarters, so as to notify the fire department instantly should a sprinkler head open for a fire.

Cleveland's municipal officials have shown a fine cooperative spirit in protecting this famous old church. Likewise they are protecting the city's tax income and taxpayers by encouraging owners of sprinklered property to install Gamewell fire alarm boxes to supervise their sprinkler systems in this most *efficient, direct* and *economical* manner.

*Let us send you our bulletin "If a Sprinkler Head Went Off Tonight."*

## THE GAMEWELL COMPANY
NEWTON, MASSACHUSETTS

# Police—Fire—Safety Items

**of Interest to Departments of Public Safety**

## *Police Radio Systems*

THE use of radio by police in law enforcement continues to expand, the Federal Radio Commission points out in its annual report to Congress, according to *The United States Daily* for December 7, 1932. Thirty more stations were added during the fiscal year ended June 30, 1932, making a total of 92 stations either licensed or under construction.

These stations, in 50 cities reporting, transmitted 155,656 emergency calls, reported 12,676 arrests, and served a population of 32,585,000. The following additional information was taken from the report:

It was found that the average time required to transmit one call was 1 minute and 2 seconds. A total of 2,255 automobiles are equipped with radio receivers. From one-half of the 50 cities reporting, a total of $386,953 worth of property was recovered. Arrests reported through the use of radio numbered 12,676.

It has been suggested that a two-way communication system should be provided to permit patrolmen in cars to transmit back to headquarters or to other cars information of general importance in combating crime. It is recognized that a two-way system of communication has some advantages and would permit greater flexibility in the handling of a motorized police force. However, no consideration can be given to the authorization of such service until a sufficient number of frequencies becomes available.

One city reports that in one month 15 persons were caught in the actual commission of crime. Another city believes that police radio could be better administered by the installation of small low-powered transmitters in each precinct to serve that precinct alone. Another has completely abolished all precinct stations and operates the entire system from the central headquarters. Still another city reports that it connects the telephone system to the police transmitter during the reception of emergency calls in order that all cars may hear the actual conversation between the dispatcher and the citizen reporting the emergency.

The number of frequencies suitable for municipal or state police radio service is limited to a relatively small portion of the radio spectrum. The specific frequencies available for exclusive use by the police radio stations differ only slightly from those which were assigned a year ago. Under the new plan eight frequencies are assigned for use by municipal police radio stations and two by state police stations. Police frequency assignments are separated by 8 kilocycles, with the result that cross-talk and heterodyne interference has been practically eliminated.

There is belief on the part of some licensees that a separate frequency should be assigned to each municipality. Obviously, with only eight frequencies available such a system could not possibly be as efficient as the present zone system of allocation. For example, in one metropolitan area there are 19 cities located in 80 districts, and nearly all of these cities are within 20 miles of the center of the city.

If different frequencies were assigned to all these municipalities, the adjacent police departments would not be notified of crimes committed in neighboring cities and there would be delay in the apprehension of criminals who made their escape to the adjacent municipalities. Furthermore, serious interference in broadcasting would be likely to result.

## *Extensive Fire Training Course for Oklahoma Cities*

A THOROUGHGOING system of instruction for firemen is being worked out in Oklahoma through the collaboration of the State Association of Firemen, the State Department of Vocational Education, the Oklahoma A. and M. College, the University of Oklahoma, the Oklahoma Municipal League and the Oklahoma Inspection Bureau. The Association of Firemen has for five years had an educational committee charged with the responsibility of developing a course of instruction and training for firemen, and fire schools have been held under the committee's auspices in four cities. It is now desired to extend the benefits of this training to include as many as possible of the 5,000 firemen, both paid and volunteer, in the state, and the institution of a teacher training service whereby skilled firemen can become qualified as instructors for other firemen is deemed to be the proper method. The work of the Federal Board for Vocational Education (see THE AMERICAN CITY for October, 1932, pages 49-51) is being taken advantage of. The first unit of the teacher training program was established in the fall, at the A. and M. College, with representatives of 22 cities present. This work is to be expanded so as to train instructors for more municipalities, and possibly itinerant teachers for sparsely settled territory.

## *New Traffic Safety Contest Begins This Month*

A NATIONAL Traffic Safety Contest for 1933, similar in general to the one now in progress, gets under way with the beginning of the current month, according to the *National Safety News*, published by the National Safety Council, 20 North Wacker Drive, Chicago, Ill. The population groups will begin with 2,500 as the lower limit and will be separated by the following population points: 10,000; 25,000; 50,000; 100,000; 250,000, 500,000. It was found that the very small communities were not in a position to take an active part in the race. The *National Safety News* gives the following additional information:

"The most important change in the present rules is a requirement that all cities make monthly reports of all fatal and personal injury motor vehicle accidents classified by age and type of accident. This report is called for in the Standard Monthly Report Form and it will not be difficult for any city to meet this requirement. Any cities 60 days in arrears on such reports will be automatically dropped, but may be reinstated on making full reports later. This may cut down the number of cities nominally participating, the Committee concedes, but it will increase the value of the contest to those who do participate. Most cities in the present contest made such reports, but a few do not.

"Another important improvement is that the mayor of a city may, if he wishes, designate two 'contact' men instead of one as formerly. It will be suggested to him that he select one to handle the engineering and enforcement items, including statistics, and a second to supervise the educational work. It would be expected, though not required, that the former would be a city official and the latter an official of the local organization sponsoring the campaign. This improvement was suggested after it was found in the present contest that some of the contact men who are city officials are not completely familiar with the educational work in their communities, while others, who represent local organizations, are not entirely familiar with the work of the city departments.

"In the grading schedule there will be only minor changes. The quality of the traffic engineering work will be stressed but the item regarding a traffic survey will be eliminated because it was often misunderstood. Some relatively unimportant changes have been made in the enforcement and public education requirements.

"Circulars giving all details of the contest are now being printed and will be distributed during the coming month. Registration will commence immediately.

"The 1932 contest, now entering its final month, has more than come up to expectations. There are 442 cities entered and by far the majority have participated actively—even intensely."

Judging the 1932 contest begins soon.

# THEIR LIVES are at stake

IF your Police Force is *under-motorcycled* you and Reckless Motoring are gambling — with the lives of your fellow citizens at stake.

Scores of communities have proved that Police Motorcycles are the surest safeguard against traffic casualties. But the Motorcycle Patrol must be adequate for the territory it must cover and the traffic volume it must control. Too many Forces are under-motorcycled.

There are many jobs in traffic control that only motorcycle officers can do efficiently. And the officers are most efficient when equipped with Harley-Davidson Motorcycles. This, too, is a matter of record.

HARLEY-DAVIDSON MOTOR CO., Dept. M, Milwaukee, Wis.

**More Motorcycle Police Mean More Protection**

Our Police literature — free for the asking — will lay many interesting facts before you. Facts about traffic control. Facts about our Police Motorcycles, 1933 models Send a postcard for it today.

**HARLEY-DAVIDSON**

*The Police Motorcycle*

THE AMERICAN CITY should always be mentioned when writing for this material which is furnished free.

# DON'T GET BEHIND *The* TIMES

# READ CATALOGS

Keep your files up to date by checking over these items each month and writing for those you need.

### BLACK PIGMENT FOR CONCRETE PAVEMENT

**245.** Charon, a black pigment for concrete, makes possible a permanently dark background of concrete for laning, and eliminates road glare. It is easy to mix with the concrete, easy to handle and low in cost. Full data on the use of Charon may be secured from Godfrey L. Cabot, Inc., 940 Old South Bldg., Boston, Mass.

### WATER-WASTE SURVEYS

**246.** The Pitometer Co., 52 Church St., New York, experts in water-waste surveys, trunk main surveys, water distribution studies and penstock gagings, will be pleased to send circulars describing each of these activities to any interested water-works officials.

### STREET LIGHTING FURNISHES BIG RETURN ON ASSESSMENT

**247.** A broad survey which included many previous studies, covering in all 92 cities and in addition 4 states, has shown quite conclusively that approximately one-half of the night accidents in cities could be eliminated through more nearly adequate street lighting. The elimination of these preventable accidents, it was shown, would mean a saving of $185,000,000 annually, or over $2.70 per capita. Copies of this survey included in the report of the Street Lighting Committee of the Illuminating Engineering Society may be secured from the General Electric Co., Schenectady, N. Y.

### SEALS FOR STOP COCKS, UNIONS AND METERS

**248.** The United Seal Co., Columbus, Ohio, will be pleased to send to water department officials complete information and illustrations of stop-cock seals, union seals and lead and wire seals for meters.

### AN ALL-STEEL STADIUM

**249.** A new type of all-steel stadium or grandstand has been announced by The Ingalls Iron Works Co., Birmingham, Ala., in which the number of seams has been reduced to a minimum and all seams are electric welded by the shielded arc process, giving watertightness and permitting use of the space beneath. A complete description and illustrations of this type of patented construction may be secured from the manufacturer.

### AN AUTO PATROL SNOW-PLOW

**250.** Caterpillar Tractor Co., Peoria, Ill., has developed a snow-plow for Caterpillar auto patrols. It is described and illustrated on Form 1685, which the Caterpillar Tractor Co. will be pleased to send on request.

### A NEW HEAVY-DUTY TRUCK AND BUS ENGINE

**251.** Sterling Engine Co., Buffalo, N. Y., will be glad to send to those interested its recent literature describing the Sterling Petrel engine, a 6-cylinder, turbulent L-head, powerful engine, designed for heavy duty, long life and economical operation.

### A BIGGER BULLDOZER FOR BIGGER TRACTORS

**252.** LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa, has announced a new hydraulically operated bulldozer for the Caterpillar Sixty-Five tractor. This bulldozer has an extreme high-lift of 34 inches above ground level and an 18-inch drop below ground level, and is equipped with a shock absorber. It is described and illustrated in literature which may be secured direct from the manufacturer.

### A ROTATING DEEP-WELL PUMP

**253.** The Luitwieler system of deep-well pumping, using the screw type Luitwieler Multipellor, is described in literature which may be secured from the Luitwieler Corp., 123 Ames St., Rochester, N. Y.

### MAKE YOUR CITY PARKS MORE BEAUTIFUL

**254.** Your city parks and public grounds can be made more beautiful than ever with some of the new plantings of shade trees and flowering shrubs selected from the large stock of the Boyd Nursery Co., McMinnville, Tenn. The catalog and new low price list may be secured without obligation.

### WATER-WORKS PUMPS

**255.** The Murray turbine of the multi-blade stage type, operating condensing, lends itself to water-works service, since the pumps are ordinarily operated at relatively low speeds and connected by means of Murray reduction gears to the turbine. Complete information regarding these turbines, pumps and reduction gears may be secured from the Murray Iron Works Co., Inc., Burlington, Iowa.

### CORROSION- AND RUST-RESISTING IRON PIPE

**256.** The Republic Steel Corp., Youngstown, Ohio, has issued a 64-page illustrated booklet on Toncan iron pipe and its history, advantages, rust- and corrosion-resisting properties, comparisons with other ferrous pipes, its physical properties, data on its ability to take welds easily, and a discussion of the fields in which it is used.

### A NEW ROTARY-DISPLACEMENT OIL PUMP

**257.** Catalog L-10 describing and illustrating the De Laval-Imo Series A 31 N oil pump, a rotary displacement pump using a new principle, which has only three moving parts and operates equally well with the shaft horizontal or vertical, may be secured by those interested from the De Laval Steam Turbine Co., Trenton, N. J.

### A NEW SPRINKLER SYSTEM

**258.** The new simplified Rockwood sprinkler system for schools, institutions and small public buildings, which is designed to insure protection against damage from fire, is described in literature which the Gamewell Co., Newton, Mass., will be pleased to send on request.

### A NEW TIRE FOR TRACTOR SERVICE

**259.** Complete information in regard to a new tire for tractor service, a pneumatic companion to the Goodrich Zero Pressure tire, which is specially designed for road service and is known as the Tractor-Grader tire, may be secured by those interested from the B. F. Goodrich Co., Akron, Ohio.

### FENCE POST FOR AIRPORT ENCLOSURES

**260.** Full information regarding the valuable qualities which make possible the expansion of an airport without excavation when moving a fence at the time of enlargement may be secured from the Anchor Fence Post Co., Baltimore, Md., in a reprint, "Engineering Essentials for Airport Enclosures," by Captain Frederick Schauss.

### REPORT OF WATER-TANK PAINT TEST

**261.** A preliminary report of the extensive tests of paint for the interiors of water tanks, containing detailed information as to the manufacturers' names, kinds of paint, price per gallon, spreading rate and approximate cost per 1,000 square feet of the paints having the best ratings in the test, is to be published by the Pittsburgh-Des Moines Steel Co., 3408 Grand Ave., Neville Island P.O., Pittsburgh, Pa., and copies may be obtained upon publication by mailing requests direct to the company.

### METERS FOR WATER MAINS

**262.** Bulletin 301 issued by R. W. Sparling, 945 N. Main St., Los Angeles, Calif., contains complete descriptions of Sparling main-line water meters, pictures showing the method of installing a Sparling meter in a main and in pumping stations, reproductions of charts from these meters, prices and the Sparling guarantee.

***Return this coupon and you will receive the catalogs requested*** 1-33

THE AMERICAN CITY MAGAZINE
470 Fourth Avenue, New York, N. Y.

I am interested in receiving the catalogs mentioned in Items Nos. .....

.....

Name ..... City .....

Title ..... State .....

### A SAND SPREADER FOR TRUCK MOUNTING

**263.** Bulletin KSS describing the Good Roads sand spreader, which is an independent unit consisting of a steel hopper, screw conveyor, spinner disc, gasoline engine, drive gears, shafting and bearings, all mounted on channels as a single unit, for mounting on any standard truck chassis, and which spreads, under normal conditions, about 3 miles of sand 9 feet wide, may be secured by those interested from the Good Roads Machinery Co., Inc., Kennett Square, Pa.

### A FILTER SAND THAT REMOVES TASTE AND ODOR

**264.** Minchar, a carbonized-aluminum-silicate, which is a combined deodorizing and filtration medium for public water supplies, is distributed by the Minchar Corp., Elmira, N. Y. Complete information regarding this product may be secured direct from the manufacturer.

### A HANDY CRANE FOR CITIES

**265.** The Bucyrus-Erie Co., Department LC-10, Milwaukee, Wis., has just issued a new and comprehensive booklet illustrating and describing the Loadmaster crane, Models CT, CS and MD. It is profusely illustrated with pictures showing nearly fifty applications of this versatile crane, which is portable, and is mounted on wheels or crawlers.

### A NEW LARGE BOTTOM-DUMP CRAWLER WAGON

**266.** A new circular, Form No. 323, describing the Trackson 10-13-yard bottom-dump crawler wagon which is equipped with the new 20-25-ton Trackson crawler wheels and was designed for greater hauling capacity, may be secured by those interested from the Trackson Co., 1323 S. First St., Milwaukee, Wis.

### TWO-WAY HEAVY-DUTY TRAILERS

**267.** C. R. Jahn Co., 1140 First National Bank Bldg., Chicago, Ill., will be glad to send on request literature describing and illustrating the LaCrosse Tu-way trailer, features of which are complete reversibility, dual end steering and braking and pneumatic tires.

### A VERSATILE TRAFFIC CONTROL UNIT

**268.** Bulletin No. 16 issued by the Horni Signal Mfg. Corp., 515-521 Greenwich St., New York, describes completely the Horni Vehitrol traffic control unit, built on sound, proved electric and mechanical principles making for long, continuous life, arranged for instantaneous adjustment and regulation and designed to inspire confidence. Vehitrol can be used as a prefixed timer or for semi-actuated control or full-actuated control and will operate present signal lights.

### WATERPROOF CARPET

**269.** Carpets that are guaranteed to be absolutely waterproof and are impregnated with liquid rubber before being vulcanized to the base are made for use around swimming pools and hotels and clubs and are illustrated in the 1933 catalog of pool equipment recently issued by the American Playground Device Co., Anderson, Ind.

### REFLECTING SAFETY ISLANDS

**270.** Godwin safety islands, which include a turret of concrete, sufficiently strong to stop any motor vehicle, with a polished stainless steel approach end on the turret and a floodlight mounted on the bottom of the signal lamp, giving adequate illumination, are described in the literature of W. S. Godwin Co., Race and McComas Sts., Baltimore, Md.

### A SNOW LOADER WHICH HANDLES 50 YARDS A MINUTE

**271.** Baldwin-Southwark Corp., Southwark Foundry and Machine Co. Div., Philadelphia, Pa., will be glad to send to interested city and county road and maintenance engineers Bulletin No. 31 describing its snow loader, which is designed for use with a truck and can handle 50 yards per minute.

### ICE CONTROL WITH CALCIUM CHLORIDE

**272.** There is no need for accidents on city streets caused by ice. Proper treatment with calcium chloride will prevent skidding and save lives. Complete data on the use of calcium chloride for ice control may be secured from the Dow Chemical Co., Midland, Mich., Columbia Alkali Corp., Barberton, Ohio, Solvay Sales Corp., 61 Broadway, New York, and Michigan Alkali Co., 10 E. 40th St., New York.

### ANGLE COMPOUND AIR COMPRESSORS

**273.** Sullivan Machinery Corp., 400 N. Michigan Ave., Chicago, Ill., will be glad to send to those interested copies of its new Catalog No. 88-A, which describes and illustrates the new Sullivan angle compound air compressors for stationary installations.

### A NEW 2-TON ASPHALT PUGMILL MIXER

**274.** Details of the new Iroquois 40-cubic-foot or 2-ton asphalt pugmill mixer, which in actual service has produced 600 tons of resurfacing material in one day of 22 hours with 4 minutes specified mixing per batch, may be secured from the Barber Asphalt Co., 1600 Arch St. Philadelphia, Pa.

### A NEW MECHANICAL ASPHALT SPREADER AND COMPACTOR

**275.** The Adnun Engineering & Mfg. Co., Nunda, N. Y., has announced the Adnun black top paver, a mechanical asphalt spreader which lays a 10-foot width of binder or top 10 to 25 feet per minute uniformly, can be set to crown roads and back curves and can use the lumpy asphalt material which is now wasted on so many jobs. Illustrated literature with diagrams will be sent on request.

### SIMPLICITY IN CHLORINATORS

**276.** Technical Publication 38 published by Wallace & Tiernan Co., Inc., Newark, N. J., describes the simplicity of W & T Vacuum chlorinators, in which the complete operation of the chlorinator is visible, preventing any chance of trouble developing, as the working parts are always in plain sight.

### RELIABLE MASTER METERS

**277.** Accuracy, reliability and simplicity are important in a master meter. It is also necessary that it be possible to check and adjust such a meter easily. These are specific features of Simplex venturi type meters, which are used in pumping stations and filtration plants and on reservoir pipe lines. Bulletins issued by the Simplex Valve & Meter Co., 6743 Upland St., Philadelphia, Pa., give full information regarding the service of these meters.

### REINFORCED CONCRETE PIPE

**278.** Reinforced concrete pipe, which has proved successful in many long municipal water projects and which is made on the job, using local labor under expert supervision, is completely discussed in literature of the Lock-Joint Pipe Co., Ampere, N. J.

### AERATORS FOR WATER WORKS

**279.** Units which combine aeration of treated water and mixing of chemicals with the water are described in the Aer-O-Mix literature of Vogt Bros. Mfg. Co., Inc., 14th and Main Sts., Louisville, Ky.

### CAST IRON PIPE SPECIALS

**280.** Donaldson Iron Co., Emaus, Lehigh County, Pa., manufacturer of cast iron pipe for water and gas service, will be pleased to send complete information regarding its products and also quotations on special casting and flange work.

### NURSERY STOCK AT WHOLESALE

**281.** Those interested in city park, street and cemetery planting are especially invited to visit the nursery of W. & T. Smith Co., Geneva, N. Y., consisting of 1,000 acres of selected stock. Those who cannot visit it should send for the special price lists which are available on possible large orders for municipalities.

### WATER METER QUALITY CUTS TAXES

**282.** With municipal tax rates rising and revenues all pledged to meet other needs, city water works must be self-supporting. This requires quality meters which guard the water department treasury. Information regarding the economy of American and Niagara meters may be secured from the Buffalo Meter Co., 2902 Main St., Buffalo, N. Y.

### REJUVENATION OF CITY STREETS

**283.** Stanolind cut-back asphalt when used for the rejuvenation of city streets satisfies the most severe traffic requirement. Information as to how the Lincoln Park Commissioners of Chicago handled the problem in 1930 and how others are maintaining their streets economically may be secured from the Standard Oil Co. of Indiana, 910 S. Michigan Ave., Chicago, Ill.

### PROTECTIVE HELMETS FOR POLICE AND FIREMEN

**284.** Police and fire departments should be equipped with Bulldog helmets, which are strong, serviceable protecting hats of good appearance, waterproof and molded in one seamless piece of insulating materials. The broad, rigid brim is designed to protect the face, eyes, ears, neck and shoulders from falling and flying materials and also to deflect water from the neck. Descriptive literature and a demonstration may be secured by writing to the Mine Safety Appliance Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa.

### HAVE YOU ADEQUATE STREET LIGHTING?

**285.** Many cities have "twilight zone" streets where the lamps make only small pools of light surrounded by shadow. There is a deceptive half-light between obvious darkness and adequate illumination. The Westinghouse Electric & Mfg. Co., 1216 W. 58th St., Cleveland, Ohio, has issued a book, "Bringing Cities Out of the Twilight Zone," which it will be pleased to send free on request to any officials or civic organizations interested in adequate street lighting because of its advertising value for the city and its promotion of safety.

### THE ECONOMICAL IMPROVEMENT OF GRAVEL ROADS

**286.** Highway officials are attracted by the sound economy of maintenance of gravel or old macadam roads with bituminous material. Tarvia, produced by The Barrett Co., 40 Rector St., New York, offers a simple, effective and inexpensive means of protecting the tremendous highway investment in existing macadam and gravel roads. Whatever your road problem—new construction, repair or maintenance—the Tarvia field man is at your service with practical advice founded upon actual experience. 'Phone, wire or write to The Barrett Co.

### MOWING COSTS CAN BE REDUCED

**287.** 1933 Coldwell power lawn mowers and rollers will effect economies, at the same time giving lawns a finer finish and a heavier, better wearing turf. Full particulars regarding this lawn-mowing and rolling equipment may be secured from the Coldwell Lawn Mower Co., Newburgh, N. Y.

### PERMANENT STREET SIGNS

**288.** Permanence is an inherent characteristic of brass street signs, for brass is a non-corrosive metal. Union street signs built of brass are described in the catalog of the Union Iron Products Co., Dept. H, East Chicago, Ind., which also contains a list of brass street sign installations that have stood the test of time.

### SAFE BRIDGE FLOOR CONSTRUCTION

**289.** City officials can secure complete information regarding T-Tri-Lok bridge floor construction, which is economical, has adequate strength, can be completed rapidly, and provides an anti-skid surface and a light superstructure, from the Carnegie Steel Co., Pittsburgh, Pa.

JANUARY, 1933

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The American City

470 Fourth Avenue
New York

35 Cents, $2 a Year

# Street Maintenance Costs Cut One-Half in Houston, Texas

*By* S. A. STARKEY

Street and Bridge Commissioner
Houston, Texas

STREET maintenance is a phase of municipal management that affects every resident of the city and practically every visitor and it is essential that the city get the most for its money in this matter. Houston has made very gratifying progress, having a fine system of streets which are for the most part kept in excellent condition at a comparatively low cost.

The altitude of Houston is approximately 54 feet, hence much drainage is naturally required, a factor which means increased street maintenance cost. In spite of the fact that 1,500 lineal miles of drainage ditches must be maintained where storm sewers are not present, the street maintenance cost is approximately $324 per mile annually. This cost is below the average in cities of similar size and is less than one-half the average maintenance cost per mile once incurred by Houston.

TYPE OF STREET MARKER DEVELOPED IN HOUSTON, TEXAS

## Making the Reduction

This reduction has been brought about in numerous ways. In the first place, politics has been eliminated and the Department is operated on an ethical business basis. We have worked out effective management methods and systems of record keeping which assure eight hours work from every employee of the Department who is paid for a full day.

In 1925, the city of Houston had 740 miles of streets; and for that year, $562,700 was spent for maintenance. For the next several years, the appropriation was increased annually by approximately $100,000. In 1929, the street maintenance appropriation was $808,000 for the 740 miles of streets, or more than $1,000 per mile.

Up to and including the first five months of 1929, the city had been letting the maintenance of the hard-surface or permanent streets to private contractors. In 1925, the city had less than 200 miles of permanent streets, yet their maintenance cost $120,000 annually. This sum was expended annually until May, 1929. At that time $100,000 of the contract price had been paid out for maintenance of the permanent streets, leaving $20,000 for the next seven months. At this point, the city forces took over the entire upkeep and maintenance of all city streets—and at about this time, through annexation of suburbs, the total street mileage was increased to 1,001 miles.

The Department was reorganized and every economy practiced; at the same time it was endeavored to increase efficiency. First, all public utilities, traction companies, contractors and individuals were notified that the city was taking over all street maintenance and that any concern or person damaging the streets by making cuts in the pavement would be required to pay for such damage. Prior to this time, the city had never recovered a dollar for street damage; naturally, contractors, public utilities and others exercised but little care in tearing up streets.

A flat rate pavement for damage to streets was established at $4.00 per square yard for concrete base and for replacing the black topping of streets; and for inverted penetration of streets where the gravel was not saved, a charge of $2.10 per square yard was made. The charge was $4.00 per square yard for replacing brick paving; and for straight gravel and dirt streets no charge was made if the street was placed back in the same condition, but if it was not replaced, a charge was made for the necessary materials and labor required to fix the damaged place, plus a 10 per cent overhead charge.

## Organization of the Department

The Houston Street Department is divided into six districts each, with a superintendent who is responsible for all work in his district and who watches for damage

CLEANING UNDER A CROSSING OF A SURFACE DRAIN

due to pavement cuts. Any firm or individual making a cut or installation in the street is required to furnish a bond or put up a cash deposit ranging from $10 to $500. The bond or cash deposit is not released until approved by the general office, and approval is not given until all damage claims have been paid.

A regular street repair crew is maintained. The foreman acts as time-keeper and keeps a record of all materials and labor used for every job. In billing the public utilities, etc., the Department furnishes a list of the materials used so that the utility may check the costs. Permission is given to these concerns to make their own repairs to damaged places if done under the supervision of the Street and Bridge Department; but very few contractors or utilities take advantage of this. The $4.00 per square yard rate for permanent pavement replacement gives the city a $1.50 gross profit, which is utilized in maintaining supervisors for the jobs that are done by the firms personally.

One of the things stressed in the campaign for reduced street maintenance cost is the conversion of gravel streets into gravel streets with bituminous topping. In 1925 there were only 11 miles of bituminous surface streets and 330 miles of gravel streets. With an increase of 261 miles of streets, there are now 101 miles of bituminous streets and 449 miles of gravel streets, which with 351½ miles of permanent streets and 99½ miles of unimproved streets gives a total mileage of 1,001.

### Some Cost Data

The difference in cost per square yard between gravel and black-topped gravel is approximately 30 cents per square yard; but the difference in cost of maintenance is great. For example, a pot-hole in a gravel street usually requires a yard of $3.00 gravel to repair, for what is not used in the hole is scattered about over the street. But with a bituminous surface street, only the hole can be filled. When the rock and asphalt fills the hole, no additional quantity can be used; and a crew with rock and asphalt pot can keep many miles of street in repair.

Another factor that contributes to reduced maintenance cost is the policy of replacing wooden culverts with concrete or galvanized culverts. In addition, it is found profitable, as well as a safety measure, to pave or hard-surface the unpaved gaps in front of property where the owners were unable to pay the cost of the original paving.

### Preventing Unemployment

The Street Department has not added to the unemployment situation by reducing the number of employees to cut costs. There is an average of 325 people in the Department. The city has been successful in getting more work done for the money. A double check is made on the time-keeping. The crew foremen keep time; then a supervisor makes each gang twice daily and records the time of each employee or makes a notation of why any employee may be absent. These time sheets are transferred to weekly records and filed in the general office, which with the foreman's sheets gives a double check on every workman.

### Complaints Are Not Lost or Buried

A system for recording all complaints has been developed. Repair order books are made in pad form in dupli-

A GRAVEL STREET, AT LEFT, BLENDING INTO AN INVERTED PENETRATION TYPE PAVED STREET IN HOUSTON

EQUIPMENT USED IN DIVISION 2, HOUSTON

cate sheets. Each complaint coming from any person within the city is written on the repair order sheet, the original sheet is given to one of the six superintendents, and from the duplicate sheet a clerk records the complaint in the ledger. The superintendent of the district where the complaint originated must make an inspection, and when the repair is made, this fact is entered in the ledger opposite the complaint. In this way, no complaint is allowed to become buried or ignored.

All contracts are awarded to the low bidder regardless of friendship, and every purchase must come up to specifications. All purchases are carefully checked in at time of delivery.

### Other Street Department Activities

Street maintenance work naturally covers many operations other than building and repairing streets. The Department operates eight mowing machines during the growing season, to cut the weeds from the shoulders of the streets. The maintenance of drainage ditches costs $80,000 annually. Sweeping and flushing of streets adds $60,000 annually to expenses.

The business section of the city and the surrounding section are swept and flushed each night. In the residential sections of the city, the streets are swept two or three times weekly.

Twenty-five hundred street markers have been placed by the Department during the past few months at an installation cost of about 75 cents each. These markers are square 4 x 4-inch posts which are painted white and lettered. The cost is low and maintenance is trivial.

Even the humanitarian element enters into the work of the Street Department. The trucks are used to distribute free milk and fuel to destitute families. About 10,000 tons of fuel alone were delivered during the 1931-32 winter.

In Texas, the State Highway Department figures the average cost for highway maintenance at $375 per mile annually. City streets are wider than highways, the traffic is much heavier, sweeping and flushing costs are additional, draining is more of a factor, but the cost in Houston is only $324 per mile annually for maintenance. It is confidently expected that this will be still further reduced by enforcing rigid efficiency and converting gravel streets into bituminous streets as fast as possible.

## A World Economist's View of Governmental Spending

"SUPPOSE we were to stop spending our incomes altogether, and were to save the lot. Why, everyone would be out of work. And before long we should have no incomes to spend. No one would be a penny the richer, and the end would be that we should all starve to death—which would surely serve us right. The same is true and even more true of a local authority. Now is the time for municipalities to be busy and active with all kinds of sensible improvements. You cannot set men to work by holding back, by refusing to place orders, by inactivity. Nationally I should like to see schemes of greatness and magnificence designed and carried through . . . For example, why not pull down the whole of South London—housing on that convenient area a much greater population than at present, in far better buildings, yet at the same time providing hundreds of acres of squares and avenues, parks and public spaces, having, when it was finished, something magnificent to the eye, yet useful and convenient to human life as a monument to our age. Would that employ men? Why, of course it would. Is it better that men should stand idle and miserable, drawing the dole? Of course, it is not."

JOHN MAYNARD KEYNES, of Cambridge University, England, discussing the economy program of the British Government in his recent book, "Essays in Persuasion."

The views of leading American economists appear on pages 5 and 54.

# Correcting Trouble with Customers' Services

*By* H. W. NIEMEYER
and
J. A. BRUHN
Indianapolis Water Company,
Indianapolis, Ind.

SUBNORMAL or inadequate water service, whether caused by factors under the control of the water plant or due to conditions within the customer's property, almost always results in complaint against the utility and eventually will tear down good public relations if not properly attended to. Regrettable though it is, the average user of water, without investigating unsatisfactory flow at fixtures and for sprinkling use, blames the water utility. It has been our experience in Indianapolis that in many cases inadequate service due to such causes as undersized piping, defective fittings or poor installation, worn or small sprinkling hose, faulty heaters and softeners, or obstruction in the service line, has been tolerated for long periods by customers without complaining to us. Although no inquiry was made concerning the service, there may have been a question in the user's mind, sometimes expressed to others, relative to the efficiency of the utility service.

## Causes of Poor Pressure

Causes of unsatisfactory volume of water at outlets, which the customer invariably terms "poor pressure," may be divided into three classifications:

1. Minimum static pressure in distribution mains.
2. Service line (size, length, material, obstruction preventing normal flow). Meter and connections, necessary valves and cocks are included as part of the service line.
3. Interior piping.

Our estimate on pressure inquiries received from customers during 1931 showed that approximately 60 per cent were the result of interior piping. Practically all the rest come under classification 2 or a combination of 2 and 3.

During the past five years there has been a marked increase in the demand for water through changed standards of living, new types of plumbing fixtures, lawn-sprinkling devices and cooling equipment. Larger service lines and interior plumbing have not kept pace with the greater demand. This appears to be more or less a natural development, and one contributing factor may be that competing plumbers when figuring on additions to existing systems must keep the cost down in order to increase their chances of securing the job. It would, of course, be a more satisfactory and permanent policy for the owner to have competent specifications made on the work.

## Running Down Complaints

Beginning several years ago, all inquiries coming to the Indianapolis Water Company, whether by letter, telephone or directly from consumers, were centralized in a division of the commercial department. On those requiring an investigation, monthly records are kept and letters are written informing the customers regarding the matter. The monthly report on inquiries received bears the following information classified in groups according to the nature of the inquiry: name, address; explanation or cause; date of disposition; and a summary on the total number of inquiries.

General inquiries may originate in any of several departments and are sent in triplicate to the inquiry division, which distributes them to the proper investigating department. One of the copies is kept as a check, to make sure that the matter is properly consummated. From the investigating department a report goes back to the inquiry division, which, if the information seems satisfactory, informs the inquirer by letter. The department doing the investigating keeps a record of the cause, for future reference. The present inquiry system works smoothly and we receive many favorable comments from consumers regarding the service.

## Procedure on Pressure or Volume Inquiries

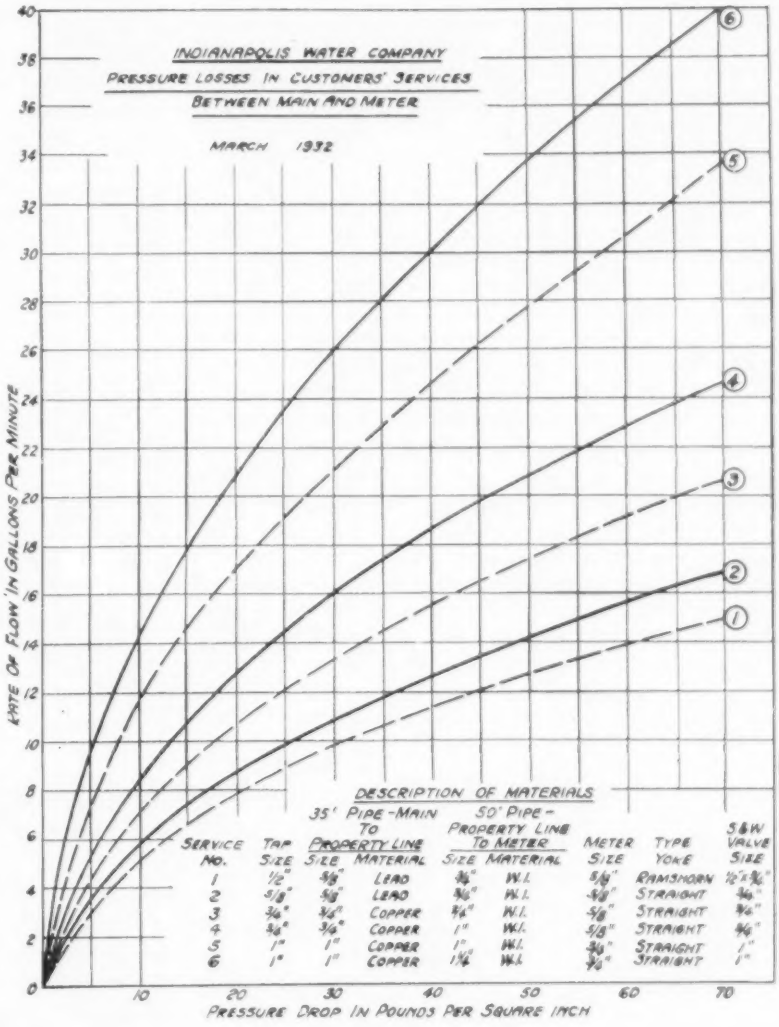
The usual procedure on pressure or volume inquiries is for the inquiry division to refer the matter to the service department, which first sends out the district man who covers that section of the city. Many times this man can locate the cause of the trouble when it is due to faulty heaters, furnace coils, softeners, partly closed valves, stuck meters and so on. Should his report, however, not seem conclusive or satisfactory to the superintendent of service and the inquiry division, two other men investigate the case with pressure gages and a test meter. The test meter carries gages on the inlet and outlet sides, which facilitates the work. These men, by observing the gages on the meter and one on the highest fixture, make a report of drops in pressure for various flows. A stop watch is used to clock the various registrations on the test meter. By opening first one outlet and then additional ones, the location and extent of trouble can be found. These data, with additional information as to size of corporation cock, length and size of service line and interior piping, and static main pressure, is turned over to the superintendent of service, who can easily determine whether or not the pressure loss in the service line and interior piping is more than normal. The inquiry division then studies the monthly consumption of that particular customer, the nature of his business, and probable peak requirements, after which recommendations are made.

The 1931 experience indicated that on about 60 per cent of the pressure inquiries the trouble was due to matters under the control of the customer, such as inadequate main line piping in the property, defective water heaters, furnace coils, softeners, valves and fixtures. Approximately 25 per cent resulted from some obstruction in the corporation cock, curb cock, service line, meter yoke or

meter. The rest proved to be a combination of inadequate service line and small inside piping. Under our present policy explanations are made to the responsible parties as to the cause of the trouble, and steps are recommended for its elimination. In cases where both the service line and the inside piping are inadequate, it is wise to have the customer make his changes before the service is enlarged in the street, otherwise the inside work may never be done. A good test of whether the customer is inconvenienced by lack of volume is his willingness to make some expenditure on larger inside piping in order to better the situation. In a few cases consumers have been unreasonable in their requests that the water company replace their service. If the company installed these at the whims of individuals without first making careful investigation, capital investments would be rapidly and unnecessarily increased.

In Indianapolis a minimum pressure of 55 pounds is carried in the central section of the city and, with the exception of the Eastern District, where a 1.5-million-gallon elevated storage tank assists in maintaining good pressure, the elevations are such that normal pressure is greater than in most cities of the United States. Therefore, troubles due to poor distribution pressure are not present.

Owing to the chemical nature of the water supply, the character of the soil, and the fact that lead services seem to work satisfactorily in Indianapolis, we do not experience serious service-line difficulties. In a few cases where examinations were made in our laboratories of parts of old lead services removed, we find deposits which the filtration department attributes to weak electrolytic action due not to external causes but to normal physical-chemical phenomena. The number of these is not extensive, and in general we are fortunate with respect to service trouble caused by corrosion, tuberculation or modulation.




DESCRIPTION OF MATERIALS

| SERVICE No. | TAP SIZE | 35' PIPE-MAIN TO PROPERTY LINE SIZE | 35' PIPE-MAIN TO PROPERTY LINE MATERIAL | 50' PIPE-PROPERTY LINE TO METER SIZE | 50' PIPE-PROPERTY LINE TO METER MATERIAL | METER SIZE | TYPE YOKE | S&W VALVE SIZE |
|---|---|---|---|---|---|---|---|---|
| 1 | ½" | ⅝" | LEAD | ⅜" | W.I. | ⅝" | RAMSHORN | ½"x⅜" |
| 2 | ⅝" | ⅝" | LEAD | ⅜" | W.I. | ⅝" | STRAIGHT | ⅜" |
| 3 | ¾" | ¾" | COPPER | ¾" | W.I. | ⅝" | STRAIGHT | ¾" |
| 4 | ¾" | ¾" | COPPER | 1" | W.I. | ⅝" | STRAIGHT | ¾" |
| 5 | 1" | 1" | COPPER | 1" | W.I. | ¾" | STRAIGHT | 1" |
| 6 | 1" | 1" | COPPER | 1¼" | W.I. | ¾" | STRAIGHT | 1" |

## "Rule of Thumb" Methods in Design of House Piping Are Disastrous

In Indianapolis, the greatest cause of poor pressure difficulties is lack of intelligent foresight on the part of plumber, builder, architect or property owner. The tendency is toward too liberal use of "rule of thumb" methods for calculations, and failure to recognize the fact that demands for water have increased. Investigations constantly reveal overloaded inside piping systems. The adoption of a factor of safety on new installations would allow for future additions to systems and should eliminate many troubles now experienced. Some customers through false economy in expenditures on water pipe of questionable size make satisfactory water service practically impossible.

## What Constitutes Good Service?

The answer to this question is somewhat a matter of opinion, but it is generally recognized that a minimum static pressure of 15 pounds per square inch is required at each fixture when no water is flowing at that fixture. This means that the service line and the house plumbing must be so designed that a static pressure of 15 pounds per square inch remains at the highest fixture when the average probable number of other fixtures are in operation. Therefore, the proper design of supply pipes is dependent on ability to forecast the probable demand of all fixtures and on knowing the capacity of a combination of service-line materials.

Ample information is available in textbooks concerning the rates of flow required by all types of fixtures, but no simplified method of determining the maximum and probable demand of a group of fixtures has been set up. The coincidence of demand of a group of fixtures will vary in different classes of service. It is quite evident that a lavatory in a public rest room will have a more frequent and different duration of demand than one in a private residence.

Tests of the pressure losses in various service-line materials, including corporation cocks, copper, lead and wrought iron pipe, curb cocks, meters, meter yokes, stop

and waste valves, and reamed and unreamed pipe cuts, in all sizes up to 1 inch, were conducted and checked within a small per cent with those made by James E. Gibson, Manager, Department of Public Works, Charleston, S. C. These tests were conducted by determining the losses of head with mercury manometers which were connected by small tubes through small orifice openings on either side of the various materials to be tested, and duplicate types of installations in actual service were used. Pressure losses for all materials were recorded for six different rates of flow. Each test was run for ten minutes, and the manometers were observed at one-minute intervals. At the conclusion of the ten-minute run the amount of water discharged was weighed and divided by ten to give the rate of flow per minute. The pressure-drop readings were averaged for the ten-minute periods. It was decided to test odd lengths of pipe in order to conform as nearly as possible to actual installations, but results were interpreted for lengths of 100 feet and plotted on true logarithm paper.

The results obtained indicate flows for new material and consequently are in variation with any that would be obtained after the material has been in service for periods of time. The progressive changes in the hydraulic characteristics of pipe in service have been thoroughly tested and reported by Professor Gordon M. Fair, Professor Melville C. Whipple and C. Y. Hsiao, of the Harvard Engineering School, and published in the *Journal* of the New England Water Works Association, Volume XLIV, No. 4. The diminishing capacity of steel and wrought iron pipe with age as compared to copper tubing is clearly demonstrated. For this reason it is considered advisable to recommend the use of larger size wrought iron pipe than in the case of copper tubing. The present cost of copper and its characteristics are such as to warrant earnest consideration of its use from main to fixture. Streamline fittings for copper tubing were not on the market at the time of the tests but we feel certain that some interesting and favorable data as to pressure loss would have been derived had it been possible to obtain flows in such fittings.

## Results of Tests

Results of the observations are given in graphical form by illustrating the pressure losses encountered in typical service installations from main to meter. Curves 1 and 2 show what improvement can be made in service capacities with practically no additional cost; that is, by the use of a full-size tap, straight-line meter yokes, and stop and waste valves with full water way. Care should always be exercised to eliminate every unnecessary flow restriction such as elbows or bends.

For new installations where the direction of plumbing is convenient, the straight-line meter yoke, which sets in a horizontal run of pipe, is most satisfactory. Every well-prepared plumbing specification calls for the reaming of all pipes to insure that they will deliver their full capacity. Results bear out the need of that specification. When flowing 10 gallons per minute through 50 feet of ½-inch galvanized wrought iron pipe with twelve joints cut in that length, the pressure loss was reduced from 28.75 pounds per square inch to 20.25, by reaming the cuts. Also, the incrustation of increased joints cuts down the area of the pipe at that point materially in a short time. The builder often loses sight of the importance of this item in accepting the lowest bid for plumbing work. Control of installation of house plumbing is beyond the jurisdiction of the utility operator, and he can only emphasize its importance to all parties concerned.

The selection of meters also has a bearing on this subject, but we will limit the discussion to the comment that we feel there is a decided tendency to oversize the meter. The importance of accurate registration should not be lost sight of.

## Selection of Service Line

It is the practice in Indianapolis to install the service line between the main and property line in advance of the permanent street improvements. In order to guarantee satisfactory service for the future customer, it is desirable to forecast the type of dwellings that will be built in these districts. It is necessary to zone the city and install services of sizes in keeping with the estimates on types of

*Facts About Water Service*

Investigation reveals the fact that in many Indianapolis properties under-sized water service lines and interior piping have been installed with resultant unsatisfactory service. The uses of water have increased during recent years, and what may have been good plumbing practice years ago is inadequate for the needs of today.

Therefore this leaflet. Its purpose is to acquaint our patrons and the plumbers and builders with the causes of unsatisfactory water service, to offer suggestions for improvement, and to serve as a warning against under-sized installations in the future.

There are several major factors which affect the supply of water available at fixtures in a building, namely

(1) Pressure in water mains,
(2) Supply pipes—condition, length, size,
(3) Interior plumbing—number of fixtures, plan, elimination of unnecessary lengths of pipe, elbows, tees, valves, etc

RATE OF FLOW PER MINUTE
REQUIRED FOR VARIOUS FIXTURES

| | |
|---|---|
| Water Closet — Tank Type | 5 to 7 Gallons Per Minute |
| Water Closet — Flushometer Type | 30 " " " |
| Lavatory — Hot Or Cold | 5 to 8 " " " |
| Bath Tub — Hot Or Cold | 9 to 12 " " " |
| Shower Bath — Hot Or Cold | 9 to 12 " " " |
| Kitchen Sink — Hot Or Cold | 5 to 8 " " " |
| Laundry — Hot Or Cold | 5 to 8 " " " |
| Hose Cock — Sprinkling Use | 6 to 9 " " " |

THE AVERAGE HOME SHOULD HAVE PIPE OF AMPLE SIZE TO SUPPLY NOT LESS THAN TWO FIXTURES OPERATING AT THE SAME TIME

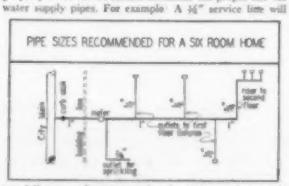
Inadequate installation in factors 2 and 3 account for practically all customer pressure inquiries. The use of small piping from which a number of branch lines or water fixtures are taken makes good service practically impossible. The pressure loss in long lengths of small pipe with elbows, tees and valves is much greater than usually estimated and frequently leads to unsatisfactory water service.

Note especially the illustration in this leaflet showing the comparative volumes of water which can be secured from various sized piping. A 1" pipe will supply four times as much water as a ¾" pipe. The normal water pressure in Indianapolis is greater than in most of the cities of the United States, and with good service lines and interior plumbing customers should have excellent water service.

*Recommendations*

A bargain in plumbing may hold down the first building costs and leave the owner dissatisfied the rest of his life because of inadequate water supply.

While the minimum diameter of service line for any property is established as ¾", the requirements of the property to be served should determine the proper size for water supply pipes. For example: A ¾" service line will



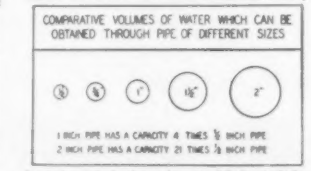

not deliver an adequate supply of water to a large residence 100 feet back from the street and provided with several lavatories, bathrooms, sprinkling connections, etc.

A ¾" service line should furnish satisfactory service for the smaller residence with one bath, one toilet and one sprinkling connection, but the six or seven-room house, with bath, two toilets, laundry trays and increased sprinkling demands requires a larger service, and for such cases, we recommend not less than 1" pipe from the property line to and including the main inside supply line.

The larger residence or building with many water fixtures merits individual study and we will be glad to cooperate with architects, builders, plumbers or other interested parties, so that satisfactory water service may be furnished.

In properties where the use of water will be more than in the average home, and the usual sized service line has already been installed from the main to the property line, it is good policy to provide a larger service line from the water main. However, if the customer does not elect to incur this expense, a larger pipe attached at the curb to the smaller section from the main, will materially increase the flow of water and may provide satisfactory service.

Ordinarily, a home or place of business is built to last several years, if not decades, and the investment will produce a proper return only if the service rendered is satisfactory. When buying a residence one is interested in the size of the lot, the building material, the exterior appearance of the house, the number and arrangement of rooms, the woodwork and floors, the lighting fixtures, and perhaps whether the bathroom has tile floors and walls. Possibly


COMPARATIVE VOLUMES OF WATER WHICH CAN BE OBTAINED THROUGH PIPE OF DIFFERENT SIZES
¾"
1"
1¼"
2"
1 INCH PIPE HAS A CAPACITY 4 TIMES ¼ INCH PIPE
2 INCH PIPE HAS A CAPACITY 21 TIMES ¼ INCH PIPE

he checks up the heating equipment and finds out whether there is an automatic water heater, and a water softener. There is little chance, however, that he hunts for the humidifier in the furnace, which keeps the home comfortable without overheating, and rare indeed is the home purchaser who inspects the plumbing—not the fixtures but the piping—as to condition and particularly as to size. EVEN THOUGH UNDERSIZED PIPING WILL RESULT IN YEARS OF DISSATISFACTION.

Adequate water supply lines are vital to the well-being of the home or place of business. *Satisfactory service can be assured for the new property*, and any unsatisfactory service in existing properties can probably be remedied without large expense.

If customers or others will let us know about cases of inadequate service, we will attempt to locate the cause and make recommendations for its improvement.

INDIANAPOLIS WATER COMPANY

AN INSTRUCTIVE PAMPHLET DISTRIBUTED BY THE INDIANAPOLIS WATER COMPANY

future development. As every utility has a different problem, no definite recommendations are necessary. Curves 1 to 6 on the graph are given to show relative capacities of typical services. Allowing a 20-pound-per-square-inch pressure drop between the main and the meter, good service may be obtained for maximum flows of 7.8 gallons per minute for service No. 1, 8.7 for No. 2, 10.7 for No. 3, 12.8 for No. 4, 17.0 for No. 5 and 20.9 for No. 6. The above designs are typical and must be varied to suit local conditions such as distribution pressure, length of service and other factors.

### Education of Customers

In order to acquaint the customers with causes for unsatisfactory service, the Indianapolis Water Company has recently prepared a small educational pamphlet. The four pages of this are reproduced as illustrations for this text. The pamphlet is distributed to architects, builders, plumbers, and persons inquiring about pressure troubles and those building new homes. It is hoped that through this and other avenues we may help customers benefit by the studies that have been made.

### A Recording Register for Meters

Studies completed to date are only the beginning of securing the desired information relative to this important subject. It has been reported that at least one meter company is considering the manufacture of a recording register for water meters. We feel that such a device is an important and needed step in the future development of these studies. Such a register installed with a meter in various types of services will tell a graphic story of their demands. It is hoped that with a collection of such data, a practical ratio between demand and number of fixtures can be determined. The instrument would also prove advantageous in cases where the customer encounters poor pressure during certain peak consumption hours or at other random periods. Indications are that the register will be on the market soon and it should be of much help to plant operators.

### All Water Utilities Should Assist in Eliminating Avoidable Pressure Losses

Not only to insure satisfactory service to consumers, to fulfill responsibility or obligation, and increase revenue is it advisable that water utilities make strong efforts to supply the growing demands for water through elimination of avoidable pressure losses in supply lines, but also because the only other solution to the problem is the maintaining of greater pressure in the general distribution system, resulting in higher operating costs, which the well-managed organization is endeavoring to reduce.

ACKNOWLEDGMENT.—From a paper presented before the Indiana Section of the American Water Works Association.

# Flushers Keep the Streets of Jackson Really Clean

## *Daily Flushing in Business District, Starting at Midnight*

THERE are 54 miles of paved streets in Jackson, Miss., which are kept clean by day and night flushing throughout the year. All the streets in the business district, amounting to about 5 miles, are cleaned every night. The remainder of the streets are flushed at least once a week. The city owns two double-unit South Bend flushers mounted on a White and a GMC truck. These have a 1,200 and a 1,500-gallon tank respectively.

The flusher that operates in the business district now starts out at midnight and works until 8 in the morning. It formerly started out at 6 in the morning and worked for eight hours. The glare of the sun on the wet pavements at a time when traffic was moving from the large residential districts in the western end of the city made driving hazardous, hence the time of flushing was changed so that the pavements would have a chance to dry somewhat before the morning traffic started for the city.

The second flusher starts at 6 in the morning and works mostly in the residential section until 4.30 in the afternoon, washing the streets clean and depositing the material in the gutters. There are four pick-up crews working throughout the city, each with a light truck, a driver and two helpers. There are three Chevrolet trucks and one Ford. The pick-up crews work from 6.30 A. M. to 4.30 P. M.

In addition to the actual cleaning of the city streets, this department has the responsibility of mowing the grass in the park areas between the sidewalks and the curbs of all vacant lots. This work is done at no cost to the owners of vacant lots, but as a service to the other taxpayers, so that the city may be uniformly attractive without high grass in front of vacant property. The department has two horse-drawn mowers, one of which is a McCormick-Deering clipper-type with a 3-foot 6-inch blade. The other is a hand machine. All the cuttings and street cleanings are disposed of by dumping at the city dump alongside the incinerator.

Street cleaning in Jackson is carried on under the direction of A. F. Hawkins, Commissioner of Streets, with H. A. Stovall, Superintendent of Street Cleaning and Garbage Disposal in charge.

## *The New "You and Your Government" Radio Series*

THE Committee on Civic Education by Radio, National Advisory Council on Radio in Education, which, in cooperation with the American Political Science Association, has sponsored two series of radio talks under the theme of "You and Your Government," announces a third series, to occur on Tuesdays from 7:15 to 7:45 p.m. (instead of 8 to 8:30 as formerly), from January 3 to June 13. It will be concerned with legislative problems, the topics being as follows:

The Legislative Prospects of 1933, Prohibition, The Congress, Budgets, The Powers of Congress, Local Government Legislative Needs of 1933, Congressional Procedure, Armaments, Philippine Independence, Farm Relief, What Is the Matter with the State Legislatures?, Tax Reform, The Lobby, Allocation of Sources of Revenue Between State and Federal Governments, Interallied Debts, Parties and Pressure Groups, Unemployment Insurance, The World Court, Aids to Legislation, Banking, Legislative Investigations, Unemployment, The Governor and the Legislature, and The Legislative Product of 1933.

# Economists Urge Increased Federal Aid to States and Cities

THAT we may look with some equanimity on a temporary deficit in Federal revenues during the present emergency, and that with the Government's ability to borrow funds at exceedingly low rates of interest,* an excess of expenditures over revenues may be justifiable and highly necessary, is the carefully considered opinion of Professor Ernest Minor Patterson of the University of Pennsylvania, President of the American Academy of Political and Social Science, as expressed last month at the New York University Conference on Taxation, Readjustment of Governmental Expenditures and Problems of Public Credit. To quote in part:

"With prices still low and with no sign of an uplift, our local governments are in serious difficulties. Their chief source of revenue—real estate—is unreliable. Tax delinquencies are high and sheriffs' sales are numerous. Revenues have fallen off, payrolls are not being met, municipal credit is low and important defaults may occur. Many of the states are under a similar though not yet so great a strain.

"Under these conditions both state and local governments are turning to Washington for help—and with good reason. They are limited in their sources of income and their fixed charges are heavy. On the other hand, the Federal Government has much larger potential revenues and can raise funds by taxation or borrowing when other governments cannot.

"At this point the situation may be summarized. Ordinary Federal expenditures are pressing steadily upward, while extraordinary ones are now increasing by leaps and bounds. State and local governments are in difficulty and are unable to increase taxes. They are slashing expenditures, in many cases recklessly and with little regard for general social well-being, and in addition are looking to Washington for help.

"The Federal Government under these circumstances cannot and will not reduce its outlays, but should and will increase them. Fortunately, its credit is good and it can still borrow at moderate rates. Taxes should be increased, but by adhering as closely as possible to the faculty or ability to pay principal and by avoiding those forms of taxation that most restrict business. Moreover, the task should be approached frankly and clearly without resort to riders.

"This brings us to the specific steps that should be taken. First is the proposal for a general sales tax. It was advanced at the last session of Congress, but fortunately it was defeated. On all counts it deserved to fail and its passage under present conditions would be little short of a calamity. For this view there are three reasons:

"First, it is not progressive but regressive. It is not based upon ability to pay. In so far as it is passed on to the consumer it adds to the cost of living. Though scattered among many articles, the aggregate effect is to increase the burden of living, especially for the great masses of people, at a time when there are said to be eleven million unemployed.

"Second, it is restrictive upon business at a time when transactions should be facilitated, not discouraged. When business men are straining themselves to increase sales, when everybody is exhorted to buy as usual, obstacles should not be created, and a sales tax is an obstacle.

"Third, many states are making use of this form of tax and many others may do so. If the Federal Government also adopts the sales tax, there will be added confusion and the aggregate burden will be a very serious one.

"For these reasons the sales tax should not be used. Another proposal is for a tax on beer and light wines. This is, of course, based upon the assumption of a repeal of the Eighteenth Amendment or of a modification of the Volstead Act. Repeal is evidently not near and it is by no means clear how high an alcoholic content in liquor is constitutionally possible unless or until the amendment is repealed. But at the best the tax yield from legalized sales of beer would bring only a modest yield and other sources of revenue will presumably be needed.

"The two sources available which are least restrictive to business and fairest in their incidence are the income and estate taxes. It is true that they were increased in the Act of 1932, but it is likewise true that they are at about the level of 1922. They have not yet been restored to the level prevailing from 1918 to 1921. The rates at those earlier dates were war rates, but the economic and financial situation of today is more serious than during the war and calls for more drastic action. . . .

"Larger revenues can be secured and in ways that will not hamper business unduly. Beyond that, funds should be borrowed to meet any expenditures that are advisable—not recklessly but confidently. Certainly there should be no resort to those forms of financing that add to the depression rather than relieve it."

### Wise Spending the Secret of Steady Prosperity

A similar point of view was expressed by several other speakers at the New York University conference, including David Cushman Coyle, consulting engineer; Bruce Bliven and George Soule, editors of *The New Republic;* Harold S. Buttenheim, editor of THE AMERICAN CITY; and Virgil Jordan, of *The Business Week.* Referring in picturesque language to the depredations of "the whirling dervishes of deflation and the experts of the castor-oil school of economics," Dr. Jordan pointed out that:

"Those who so ardently urge a balancing of budgets and curtailments of public expenditures during depressions are gluttons for punishment, for they in the last analysis must pay the price either in increased taxes or diminished income. They may imagine that they can pass it on or spread it out through consumptive taxes, but they are mistaken, for sales taxes levied to help pay interest to public bondholders ultimately come out of capital and profits in the form of lower business volume. So long as so large a part of the public liabilities are fixed and sacred as debts and armaments are, deflation of public expenditures is bound to be one-sided and to let the wind chiefly out of business and its customers. The process is apparently endless, also; for every time the purchasing power of public employees is reduced, the tax-paying power of business concerns and real-estate owners is curtailed and further economy becomes necessary. In fact, except for debt charges, there can be no reduction of public expenditure which does not curtail private expenditure and therefore tax-paying capacity is an ever-widening circle. This sort of fiscal tail-chasing is going on with ever-increasing frenzy all over the country today. . . .

"We must continue involving ourselves in this vicious circle of inconsistencies, imbecilities and insincerities until common sense and candor come back into American business thinking, unless chaos catches us first. Ultimately, I hope there will be a return of reason and sanity which will show us once more the real significance of public spending for the stability of our economic system, and teach us the true meaning of economy and efficiency in public business at least as well as we have learned it in private business, where we now know that wise spending is the secret of steady prosperity."

* Since Professor Patterson's address was delivered, the ample funds available for the Federal Government at remarkably low rates of interest have been made evident by subscriptions totaling $4,128,000,000 on an offering of $250,000,000 of one-year Treasury certificates at ¾ of 1 per cent, and exceeding $6,677,000,000 on an offering of 2¾ per cent four-year notes.

# Recent Developments in Brick Paving for Municipalities

*By* R. L. PHILLIPS
City Engineer,
Meadville, Pa.

BRICK paving has been a municipal paving from the beginning of hard-surface streets and roads in this country, and nearly all the pavements which have made brick history were laid by municipalities thirty-five, forty or even more years ago. The fact that many of these old pavements are still giving excellent service, although laid under various specifications and functioning under different climatic conditions, impresses one with the thought that a brick surface will stand a lot of abuse and will give at least reasonably satisfactory service under a great variety of conditions.

Examples of good, useful pavement can be found where all kinds of brick, of every size known to engineers, have been laid on gravel, slag, concrete or even the native soil itself, with cushions ranging from nothing at all through the various sand-cement and bituminous mixes to 2 or 3 inches of sand. The joints between these brick have been filled with everything that anybody could think of at the time, from plain sand to asphalt. Down through the years, brick has been used for any part or all of a municipal pavement, beginning with the old "double decker" type of complete pavement. Even recently, a partly worn brick surface has been converted into additional base by placing a new surface on top. In some cases, a mastic cushion has been used over old brick to establish a satisfactory crown, and a new brick surface has been laid, thus converting a former surface into a base.

Recently, the very definite trend toward standardization has made itself felt not only in the matter of brick sizes, but also in design features. In past years there was a tendency toward the isolation of individual communities in matters of street design and construction. Better distribution of literature, impartial test results, conventions, and an awakened conscience on the part of trade associations, has resulted, and will further result, in improved design and construction methods. The geographical distribution of our cities will always call for variations in some of the details of design and construction of pavements, but there is no logical reason for radically different specifications for the same service in three or four adjoining municipalities of about the same type.

### Build from the Subgrade

There is no longer any doubt of the fact that the place to start a good pavement is with the subgrade. The proper preparation of the subgrade is a much more difficult problem in cities than in open country. In contrast with the elevated roadway and deep side-ditches so prevalent in open country, city streets must usually be depressed below the grade of the adjoining lots, and surface drainage is toward the street. This handicap is difficult to overcome and often operates against the life of a pavement. Sewers, water and gas lines and service lines of all kinds laid just in advance of paving have been a cause of subgrade failure, owing to settlement. Considerable progress has been made in getting this work done far enough in advance to allow settlement to take place before the paving work is done. In Meadville, Pa., all gas lines and some water lines are laid back of the curbs; provision is made for sanitary sewer branches to the property line from the main sewer, and storm drains are laid under the gutter. This reduces to a minimum the disturbance of the subgrade immediately in advance of the paving, and is real

LAYING PAVEMENT OF 3-INCH PLAIN WIRE-CUT BRICK ON A 6-INCH, 1:3:6 CONCRETE BASE ON LINCOLN AVENUE, MEADVILLE, PA.

progress against a past enemy of new pavements.

There has been great improvement in the fine grading of subgrades, which are now, almost universally, accurately formed to true template shape after rolling.

### Concrete Base

While several types of base still find favor in certain sections, concrete is today the favorite for use under a brick surface. Cities generally seem to favor lean mixes with a tendency toward an increase in thickness to get additional strength for the constantly increasing traffic. Local aggregates are commonly used, and these frequently limit the strength of the concrete so that additional cement is of doubtful value. I have recently specified 3,000-, 2,500- and 2,000-pound concrete on a proper water-cement ratio basis. The test cylinders all broke through the aggregate and showed very little difference in strength, regardless of a considerable difference in cement content. The aggregate was considered a good gravel but was certainly the controlling strength factor in this case.

Many city engineers believe that in any event lean mixes make better bases. They mention the lower coefficient of expansion, with resulting smaller cracks and less liability of cushion loss, and state a preference for extra depth rather than richer mix. The other school of thought insists on rich mixes. Still others prefer lean mixes plus reinforcement. Probably the most common specification calls for 6 inches of 1:3:6 concrete. There should be a definite answer to this problem, which at present seems far from a generally acceptable solution.

Much progress has been made in selection of aggregates and their scientific proportioning. Progressive contractors are no longer frightened by such things as water-cement ratio, screen analysis and other laboratory developments. Central mixing plants are particularly well adapted to municipal work and are placing a clean, uniform product on the street with very much less trouble, traffic interference and waste than other methods.

Probably the greatest and most important change in practice made in recent years has been the now nearly universal insistence on a base finish which approaches that of a concrete paving surface. It is generally recognized that this surface, finished smooth and to correct template form, is necessary not only to build a smooth pavement,

LAYING 3-INCH DUNN VERTICAL FIBER LUG BRICK ON A REPAVING JOB

APPLYING THE ASPHALT JOINT MATERIAL WITH A SQUEEGEE BUGGY

but also in order that the pavement may remain smooth.

### Cushions

Cushions today are a necessary evil and have been gradually reduced from two or more inches to just as little as possible, the reduction in thickness being dependent on the smoothness of the base. One-half-inch cushions are not at all uncommon, with three-quarters standard. Most specifications make one inch the maximum and some make three-quarters the limit. Cushions for city pavement are today either plain sand, slag sand, granulated slag or a mastic composed of sand and bitumen. It is felt that a cushion should be as thin as possible, be stable and allow some movement of the brick under temperature stress. Some sands meet all requirements; the slag products have stability, but become rigid and hinder free movement of the brick; and the mastic cushion seems to more nearly approach the ideal than any of the rest. This mastic cushion is less liable to be lost in base cracks or other openings where a sufficient amount of plain sand to cause trouble might readily be lost. It has already seen considerable use and will undoubtedly be increasingly used as its good qualities are recognized. This will be especially true on hill streets and in spots where plain sand is most liable to displacement, with consequent roughening of the surface of the pavement. The light hand roller on the sand cushion has been quite frequently abandoned since the advent of the thinner cushion.

### Improvement in Paving Brick

One of the greatest improvements in city brick pavements in recent years has been in the brick themselves. The repressed and older type of wire-cut lug have been giving way to the vertical fiber type, both with and without lugs. The Arlington and other tests clearly showed the superiority of the vertical fiber types over the repressed, and the absolute uniformity of depth and the better traction afforded are impressive even to the layman. The engineer is no longer accused of letting the contractor "get away with something by laying the brick on their sides." The advantage of square-edge brick laid as close together as possible, with only space to admit the filler, is recognized. The wide joints of the older brick were a real menace to the life of the pavement when soft fillers were used. I have one pavement where the lugs on the brick

are so large and the resultant spacing so great that this job is mentioned by both the engineer and the contractor as an asphaltic concrete with a brick aggregate.

The new Dunn vertical fiber with ⅛-inch maximum lugs or its equivalent will probably be considered nearly ideal by engineers. I have laid this brick and found it very satisfactory, but feel very friendly toward the plain vertical fiber type. It is certainly preferable to have no lug than one that is too large, and if used, they should be as small as possible. Whether lugs are used or not, the brick should be laid loose and not driven up if soft fillers are to be used, or the advantage of such soft filler will be lost. I have experienced no trouble in getting asphalt penetration on many miles of lugless brick laid during the past twelve years, and every bit of this work is in excellent condition today. All the brick used were of the 3-inch depth. Municipalities still find use for repressed hillside brick to care for horses on the steeper grades, but maximum allowable grades without their use have increased.

Standardization will eventually be of great assistance to cities. The street department yard of a city which has been laying brick for the last forty years is certainly a museum of brick history. Old brick of discontinued sizes are much more valuable than new standard sizes, and it is not at all uncommon for an engineer to replace a short section of an old street in order to replenish his stock of some odd-sized brick. The city engineer should encourage standardization and should never be guilty of writing specifications that tend to prevent it.

### Asphalt Fillers and Their Use

Asphalts with penetrations adapted to the climates in which they are to be used predominate at the present time. A few engineers favor other fillers as the result of their experience and are reluctant to give them up. Given a good material, careful application at the highest allowable temperature is the secret of success, and wise officials are providing the best of supervision over this operation. The squeegee buggy is the favorite method of application, although it is possible to get satisfactory application with hand squeegees under favorable weather conditions. Individual skill has been found important.

### Importance of Curb and Gutter Construction

Mention should be made here of the curb and gutter on a good brick pavement, for the entire job is no better than the grade of this same curb and gutter. We find here a variation from granite and sandstone curb to the standard combined section of concrete curb and gutter built of a variety of mixes. I prefer the combined curb and gutter and am still building according to the two-course specification of many years ago. Out of approximately fifty miles of this type, not over two or three hundred feet has failed since the first was built in 1906. Single-course work of this nature is the more popular generally. It was found necessary this year to replace a 40-year-old brick pavement built on a gravel base. The old stone curb, even after resetting a portion of it, was not sufficiently smooth to serve as a guide for the template. An 18-inch concrete gutter was built adjacent to the stone curb to a careful grade, and furnished an excellent guide for the template independent of the old curb. It has been found desirable to pour all joints in curb and gutter with asphalt to exclude water.

### Resurfacing or Relaying Brick Pavements

For many years, the word "resurface" immediately suggested a black top over worn brick. Recently brick has been coming into its own as a resurfacing material. Some places have turned the brick to get a new surface, while others have taken up the old brick and laid new on the old base. The city of Meadville has done both, and has lifted old brick, shaped up the cushion, laid new 3-inch vertical fiber brick, asphalt-filled and rolled them, for from $1.63 to $1.75 per square yard on different jobs. This figured no salvage and was done at the time of peak prices with our own forces. During the summer of 1930, a contractor removed worn asphalt blocks from one of the main state highways through the city and replaced them with 4-inch brick on the old base, which was rolled slag 26 years old. The price was $2.24. These prices are competitive with other types of resurfacing. While brick resurfacing is desirable in all cities, it is really a lifesaver for the small municipality with small jobs to do and no asphalt plant. Practically all of the job is hand labor and any size job can be undertaken. The small city can resurface its streets with brick as the money is available, and do the entire job with a few tools and local labor. In connection with abandoned trolley lines, it has been our city's policy to take up several miles of track, remove rails, ties and ballast and replace with concrete base, cushion and brick to match the rest of the street.

### Maintenance a Measure of the Quality of Construction

Somebody has said, "The time will come when the amount expended for maintenance will, in a degree, be a measure of the quality of construction." We are all pretty well disillusioned about laying a perfect pavement, and if our experience is at all broad, we have witnessed the failure or partial failure of many of our hopes along this line. No one has found the perfect pavement, and under some conditions the best is none too good. Many kinds of pavement are giving satisfactory service in different locations, and both first cost and maintenance must be considered when a choice is to be made. The Pennsylvania law says that a property owner can be assessed only once for the cost of a pavement, but allows the entire cost of this first pavement, including drainage, to be assessed against him. We feel that we should build a long-lived pavement as free from maintenance as possible, in order to postpone maintenance and ultimate replacement until the far distant future. The fact that nearly all the streets and alleys of Meadville are paved and the net city debt is only 2¼ per cent on a 40 per cent valuation is conclusive proof that this policy pays. Ninety-five per cent of this pavement is brick. Communities which for one reason or another pay a substantial portion of first cost may feel that they must adopt some lower first cost type even at the expense of more maintenance. Even when first cost is the prime consideration, our 1931 price of $2.93 per square yard for asphalt-filled 3-inch brick on a ¾-inch cushion and a 6-inch concrete base, including grading, is hard to beat.

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# Meter Registration and Water Revenue—A Preliminary Study

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THE loss in revenue due to the under-registration of meters is a "hardy perennial" in the water-works garden, for the ability of water meters to accurately record the quantity of water passing through them is still of paramount importance to utilities whose income is dependent on such registrations.

In these times of income reduction due to business depression, keen attention is being paid to stopping gaps in the efficiency fence and to searching out any legitimate sources of income that were overlooked in more prosperous times. In this connection the Water Bureau of The Metropolitan District of Hartford, Conn., has directed its efforts to a study of the performance of meters under actual operating conditions with special reference to its effect on revenue production.

Modern plumbing equipment, requiring relatively high rates of flow for satisfactory operation, is largely responsible for the development of large-capacity meters, capable of handling high rates of flow with minimum increase in pressure losses through the meter and without sacrificing accuracy of registration.

As a result of improvements in design and construction, the performance of present-day meters is far superior to that of the older models, although the problem of under-registration at low flows still persists, to a somewhat less degree.

## Meter Requirements

The registration requirements of new disc meters, as set forth in the specifications adopted by the American Water Works Association and the New England Water Works Association, provide for registration of not less than 98 per cent, nor more than 102 per cent, of the water actually passed through the meter when tested within the "normal test flow limits," and for not less than 90 per cent of the actual flow recorded when tested at the "minimum test flow."

The recently adopted specifications of the Public Service Commission of the State of New York require registration of not less than 98 per cent, nor more than 101 per cent, within the "normal test flow limits," and a steady, uniform movement of the pointer on the initial dial during at least a five-minute period at the "minimum test flow."

The "normal test flow limits" and "minimum test flow" are as listed below:

| Size Inches | Normal Test Flow Limits Gallons per Minute | Minimum Test Flow Gallons per Minute |
|---|---|---|
| ⅝ | 1 to 20 | ¼ |
| ¾ | 2 to 34 | ½ |
| 1 | 3 to 53 | ¾ |
| 1½ | 5 to 100 | 1½ |
| 2 | 8 to 160 | 2 |
| 3 | 16 to 315 | 4 |
| 4 | 28 to 500 | 7 |
| 6 | 48 to 1000 | 12 |

## Endurance Test

Varying statements are made as to the quantity of water which may be passed through a new meter before an impairment in registration occurs. An endurance test now being made in Hartford on a group of new ¾-inch disc meters has permitted some study of this problem.

This particular test is the outgrowth of an originally planned endurance run on fifteen ⅝- and ¾-inch meters, connected in series and run open-ended for three months, during which some 325,000 cubic feet of water passed through them, at an average rate of 2.55 cubic feet per minute, without any appreciable impairment in the registration of the meters. The test was finally abandoned in favor of one which would provide an intermittent flow of water and thus more nearly approach actual operating conditions.

In this test three ¾-inch meters, selected from the original test group of fifteen, are connected in series, and water after passing through them is delivered through about 45 feet of ¾-inch pipe to a Sloane flush valve, which operates automatically at a rate of ten 4-second flushes per minute, using about 0.17-cubic foot of water per flush, which is equivalent to a rate of approximately 20 gallons per minute.

The performance of the Sloane valve used in this work has proved very satisfactory all through the severe test to which it has been subjected. Aside from the replacement of packings and occasional minor adjustments, the valve required no attention through six months of continuous service, during which over 177,000 cubic feet of water was discharged, requiring, at the rates then operated, some 713,000 operations of the valve. Following this six months' service, the valve began to give trouble and was replaced with another of the same make and type, which has proved even more successful than its predecessor, over 223,000 cubic feet of water (requiring over 1,300,000 flushing operations) having been discharged through it.

Except for necessary shutdowns due to the replacing of valve packings, testing meters, etc., this test has been run continuously since April 7, 1931. During that period some 400,000 cubic feet of water has passed through the meters, making with the original test approximately 725,000 cubic feet to date.

A comparison of tests of the meters in their present condition and when new follows:

| | METER "A" | | METER "B" | | METER "C" | |
|---|---|---|---|---|---|---|
| | New | After Passing 725,000 Cu. Ft. | New | After Passing 700,000 Cu. Ft. | New | After Passing 725,000 Cu. Ft |
| Orifice | Reg. % | Reg. % | Reg. % | Reg. % | Reg. % | Does Not Reg % |
| ½ | | | | | | |
| ¼ | 97 | 97.0 | 94.7 | 98.0 | 97.0 | 95.0 |
| ⅛ | .... | 100.7 | .... | 101.8 | .... | 102.2 |
| Full Flow | 99 | 99.1 | 100.0 | 101.1 | 100.8 | 100.8 |

The registration of each of these meters has held up exceptionally well, meter "C" being the only one to fall below new meter requirements. To date, meter "A" has proved the best all around meter; meter "B" in running some 25,000 cubic feet less than the other meters is inclined to be noisy, and has required four replacements of the bottom plate due to the water hammer developed by the quick closing of the flushometer valve. As already noted, meter "C" failed to register on the 1/32 orifice, a condition which developed at some time after 675,000 cubic feet had been passed.

The performance of these three meters indicates conclusively that meters of high quality as they are made today should give many years of service without serious impairment of registration. There is evidence, however, that meters in actual service, particularly those manufactured fifteen, twenty and thirty years ago, do not stand up as well as this test would indicate.

### Performance of Old Meters

In testing meters removed from service, those giving a satisfactory registration test are rather the exception than the rule, this condition applying to all makes of meters. Because of this condition, an extended study into the performance of old meters in service in the Metropolitan District of Hartford is being made, and this paper is in the nature of a preliminary report on the collection of data bearing on the problem, together with a few conclusions which seem to have general application.

The Hartford water system has been fully metered since 1904, and on January 1, 1932, there were 26,204 meters in service, the 1931 earnings from which amounted to $964,793.45, an average of $36.82 for each meter in service, regardless of size.

Based on a careful study of revenue returns from meters of various sizes, made several years ago, it is estimated that normal present-day percentage revenue production by size of meter averages for Hartford about as follows:

| Size of Meter | | Number in Use | Per Cent Annual Revenue |
|---|---|---|---|
| ⅝" | Billed semi-annually | 12,707 | 20 |
| ¾" | | 10,144 | 33 |
| 1" | | 2,429 | 22 |
| 1¼" and 1½" | | 457 | 10 |
| 2" and over—billed monthly | | 467 | 15 |
| | | 26,204 | 100 |

Since the ⅝-inch and ¾-inch groups contain the largest number of units (about 87 per cent of the total number in use), and since meters of these two groups bring in a substantial part of the annual revenue (53 per cent), and, furthermore, since a very considerable portion of these revenue-producing meters have seen years of service, the studies reported in this paper were confined to old meters of the ⅝- and ¾-inch sizes.

Inasmuch as preliminary tests made on old meters taken directly from service indicated the possibility of appreciable under-registration at the lower rates of flow, it seemed desirable to get accurate first-hand information on the rates at which water is ordinarily used, in order to determine what proportion of the total quantity is drawn at low rates at which under-registration was suspected.

For this purpose a number of typical single, two-family and three-family houses were selected, from which 24-hour records were secured, showing the rates at which water was used.

In the selection of these houses special care was taken to include only those types from which a large proportion of the water revenue is derived. For this reason, the more pretentious class of residences was excluded from consideration, for while the use of water at such premises is usually considerably more than in smaller houses of the same general type, the total income derived from them as a class is far less than from the considerably greater number of houses making up the smaller type.

The houses selected may be classified as follows:

| Type of House | No. Occupants | No. Rooms | Average Valuation |
|---|---|---|---|
| Single | 5 | 6–8 | $ 7,000 to $10,000 |
| Two-family | 8 | 10–14 | 15,000 to 18,000 |
| Three-family | 12 | 15–18 | 20,000 to 25,000 |

Various types of apparatus have been employed by the Bureau from time to time for securing rates of flow through meters. The earliest instrument, which was used about 1915, consisted of a standard Friez rain gage, which was put into circuit with two or more dry cells and a contact which would close the circuit at each revolution of one of the meter dials. The one-foot dial was used most generally for this purpose. The record obtained was in the form of a series of steps—five steps out and five steps back, each step representing one cubic foot. The limitations of the instrument were that nothing less than a total flow of one cubic foot could be recorded, and, further, that only one meter could be tested at a time.

As it was desirable to test rates of flow through compound meters, another piece of apparatus was developed, which, however, had the same limitations as the first piece, in so far as recording rates of flow for a less quantity than one cubic foot was concerned.

When the collection of data on rates of flow through ⅝- and ¾-inch meters was started, it was found that neither of the above instruments was suitable, because both measure in minimum units of one cubic foot, so that, on all of the measurements of flow on small meters, an instrument developed by the Neptune Meter Co. was used. This consists of a revolving chart on which a line is traced by a pen actuated by the meter disc spindle through special gearing. From the records obtained with this instrument, rates of flow can be taken off to almost any desired degree of precision. The limitations of the Neptune tester are that it can be used only for Trident meters and for recording the rate through only one meter at a time. Another instrument for determining rates of flow through meters is now under development by the Bureau, but is still in the experimental stage.

The actual rates at which water passed through each size of meter in each type of house were tabulated, and the daily per capita consumption shown, especially for single houses, is somewhat lower than might be expected. This is probably due to the fact that the figure is based on a single day's use of water, and furthermore that this observation was made in the early spring with no outside use of water for gardens, etc. It is believed that 35 to 40 gallons per capita per day is a fair year-round average for this type of house.

Table A below shows, for each size of meter and type of house, the percentage of the use of water at various rates to the total quantity used. A study of this table indi-

cates that in houses equipped with tank toilets from 27 per cent to 50 per cent of the total amount of water is used at rates less than 1 gallon per minute, and that from 38 per cent to 78 per cent is used at rates less than 2 gallons per minute. In houses having flushometer toilets the percentage of use at low rates is somewhat less and ranges from 10 per cent to 33 per cent for rates less than 1 gallon per minute, and from 20 per cent to 55 per cent for rates less than 2 gallons per minute. It is evident, therefore, that a very considerable amount of water is used at the lower rates and that the accuracy of registration at rates of flow less than 2 gallons per minute is of great importance.

TABLE A

PERCENTAGE OF WATER USED AT VARIOUS RATES TO TOTAL QUANTITY USED

⅝" METER

| Rate Gallons Per Minute | Houses with Tank Toilets: 4 Singles 13 People | | 7 Two-Family 50 People | | 1 Three-Family 13 People | | Houses with Flushometer Toilets: 4 Singles 19 People | | 1 Two-Family 6 People | | 1 Three-Family | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % | Acc. % | % | Acc. % | % | Acc. % | % | Acc. % | % | Acc. % | % | Acc. % |
| Less than ½ | 15.9 | 15.9 | 13.8 | 13.8 | 5.6 | 5.6 | 9.9 | 9.9 | 7.3 | 7.3 | | |
| ½–1 | 11.2 | 27.1 | 17.3 | 31.1 | 22.0 | 27.6 | 10.9 | 20.8 | 2.9 | 10.2 | Requires | |
| 1–2 | 11.2 | 38.3 | 25.0 | 56.1 | 22.2 | 49.8 | 12.6 | 33.4 | 10.0 | 20.2 | ¾" Meter | |
| 2–3 | 4.8 | 43.1 | 8.7 | 64.8 | 4.1 | 53.9 | 10.6 | 44.0 | 5.8 | 26.0 | | |
| 3–4 | 20.6 | 63.7 | 18.2 | 83.0 | 3.5 | 57.4 | 11.0 | 55.0 | 5.6 | 31.6 | | |
| 4–5 | 12.0 | 75.7 | 9.1 | 92.1 | 7.4 | 64.8 | 4.9 | 59.9 | 7.0 | 38.6 | | |
| 5–10 | 24.3 | 100.0 | 7.9 | 100.0 | 35.2 | 100.0 | 9.0 | 68.9 | 2.0 | 40.6 | | |
| 25–30 | .... | .... | .... | .... | .... | .... | 31.1 | 100.0 | 59.4 | 100.0 | | |

¾" METERS

| Rate Gallons Per Minute | Houses with Tank Toilets: Single | | 4 Two-Family 34 People | | 8 Three-Family 92 People | | Houses with Flushometer Toilets: 4 Singles 17 People | | 1 Two-Family 2 People | | 5 Three-Family 62 People | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | % | Acc. % | % | Acc. % | % | Acc. % | % | Acc. % | % | Acc. % |
| Less than ½ | | | 23.3 | 23.3 | 25.4 | 25.4 | 15.9 | 15.9 | 2.7 | 2.7 | 16.5 | 16.5 |
| ½–1 | ⅝" Meters | | 14.7 | 38.0 | 24.8 | 50.2 | 4.4 | 20.3 | 15.4 | 18.1 | 16.6 | 33.1 |
| 1–2 | Used | | 12.4 | 50.4 | 28.2 | 78.4 | 5.5 | 25.8 | 10.8 | 28.9 | 22.6 | 55.7 |
| 2–3 | | | 12.7 | 63.1 | 10.5 | 88.9 | 6.9 | 32.7 | 2.3 | 31.2 | 6.0 | 61.7 |
| 3–4 | | | 14.2 | 77.3 | 5.0 | 93.9 | 12.4 | 45.1 | 9.3 | 40.5 | 4.6 | 66.3 |
| 4–5 | | | 11.9 | 89.2 | 3.2 | 97.1 | 6.2 | 51.3 | 2.3 | 42.8 | 1.4 | 67.7 |
| 5–10 | | | 10.8 | 100.0 | 2.9 | 100.0 | 8.0 | 59.3 | 18.5 | 61.3 | 1.7 | 69.4 |
| 10–15 | | | .... | .... | .... | .... | 3.8 | 63.1 | .... | 61.3 | .... | 69.4 |
| 25–30 | | | .... | .... | .... | .... | 36.9 | 100.0 | 38.7 | 100.0 | 30.6 | 100.0 |

Table B shows an estimate of the amount of water used in each type of house at various rates. Values in this table are based on the average of the actual observed uses and were used in estimating the amount of unrecorded water and loss in revenue to be discussed later.

With the actual rates at which water is delivered through ⅝- and ¾-inch meters established, attention is now directed to the average accuracy of registration at these rates, as shown by Curve I of Fig. 1. This curve is based on tests of a number of ⅝- and ¾-inch meters directly after their removal from service. Summaries of the tests are given in Table C. Because the averages for ⅝- and ¾-inch meters were so nearly the same, a single curve was used to show the percentage registration for both sizes of meters. No claim is made that this curve represents a true average registration of all meters in service; as a matter of fact, meters showing abnormally low registration were purposely omitted from consideration in development of the curve.

TABLE B

ASSUMED AVERAGE USE OF WATER BASED ON ACTUAL OBSERVATIONS

| Rate Gallons Per Minute | Cubic Feet of Water Used Per Day: Tank Toilets Single | 2-Family | 3-Family | Flushometer Toilets Single | 2-Family | 3-Family |
|---|---|---|---|---|---|---|
| Less than ½ | 1.8 | 3.9 | 10.3 | 1.8 | 2.5 | 10.2 |
| ½–1 | 1.3 | 4.9 | 10.0 | 2.0 | 1.0 | 10.2 |
| 1–2 | 1.3 | 7.1 | 11.4 | 2.3 | 3.4 | 14.0 |
| 2–3 | 0.4 | 2.5 | 4.2 | 2.0 | 2.0 | 3.7 |
| 3–4 | 2.4 | 5.2 | 2.0 | 2.0 | 1.9 | 2.8 |
| 4–5 | 1.4 | 2.6 | 1.3 | 0.9 | 2.4 | 0.9 |
| 5–10 | 2.8 | 2.3 | 1.2 | 1.7 | 0.7 | 1.1 |
| 10–15 | .... | .... | .... | .... | .... | .... |
| 15–20 | .... | .... | .... | .... | .... | .... |
| 20–25 | .... | .... | .... | .... | .... | .... |
| 25–30 | .... | .... | .... | 5.7 | 20.3 | 19.0 |
| Total | 11.4 | 28.5 | 40.4 | 18.4 | 34.2 | 61.9 |

For houses with tank toilets, from 7 to 12 per cent of the total amount of water passing through the meter is apparently unrecorded, resulting in revenue losses (at 20 cents per thousand gallons) of from $0.43 to $2.58 per meter per year. In houses with flushometer toilets, unrecorded water runs from 5 to 8 per cent of the total amount used, with a resulting loss in revenue ranging from $0.52 to $2.70 per meter per year.

If $0.50 is taken as a fair average loss per year for all ⅝- and ¾-inch meters in service, the total loss in revenue for this class of meters alone would amount to over $11,000 per year in the Hartford system. It seems probable that the loss for water delivered and unrecorded on the meter is considerably more than this amount, and may possibly run as high as 5 per cent of the total revenue.

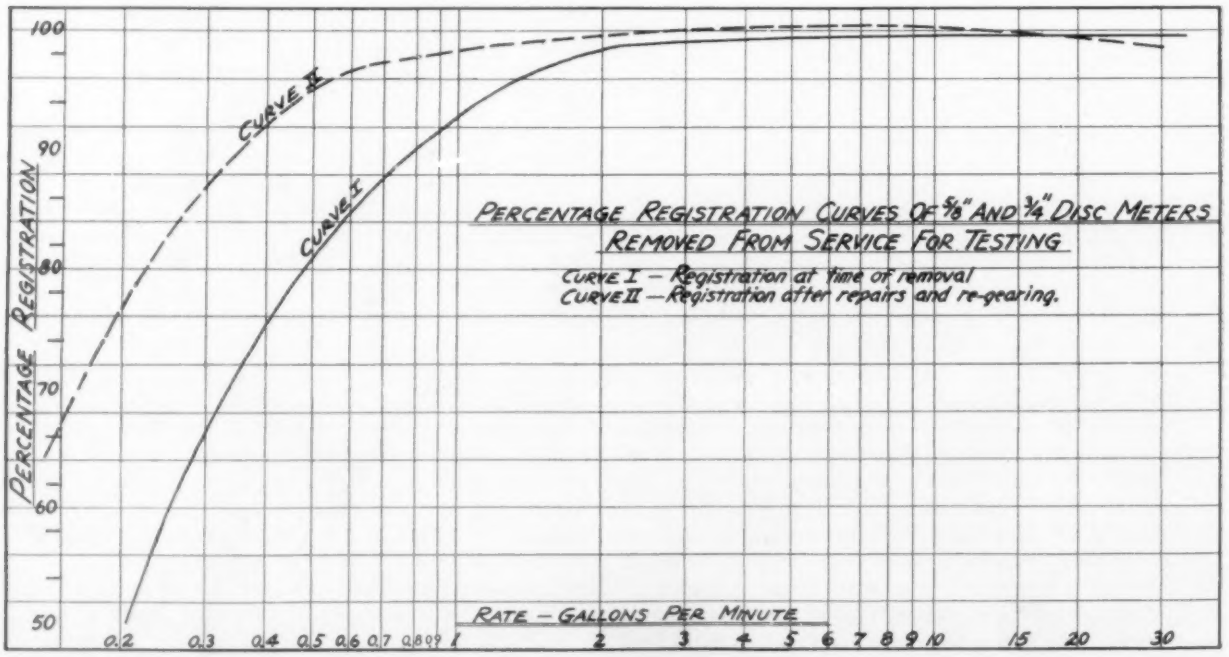
PERCENTAGE REGISTRATION
100
90
80
70
60
50
CURVE II
CURVE I
PERCENTAGE REGISTRATION CURVES OF ⅝" AND ¾" DISC METERS REMOVED FROM SERVICE FOR TESTING
CURVE I — Registration at time of removal
CURVE II — Registration after repairs and re-gearing.
RATE — GALLONS PER MINUTE
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 2 3 4 5 6 7 8 9 10 15 20 30

TABLE C
SUMMARY OF TESTS ON METERS TAKEN DIRECTLY FROM SERVICE

| No. of Meters Tested | Water Passed Since Last Test Cu. Ft. | Percentage Registration 1/32" | 1/16" | 1/8" | 1/4" | Full Flow |
|---|---|---|---|---|---|---|
| 5/8" Meters | | | | | | |
| 13 | 88,385 | Reg. | 85.8 | 98.6* | 99.4* | 99.5 |
| 3/4" Meters | | | | | | |
| 15 | 206,100 | Reg. | 83.9 | No record | | 99.6 |
| Plotting points for 5/8 and 3/4 meters Curve I | .... | | 85.8 | 98.6 | 99.4 | 99.5 |

* Average for 7 meters only.

## Testing Methods Changed

In an effort to reclaim a portion of this revenue, extensive changes were made in the method of testing meters. The shop equipment for testing meters consists of a Neptune Meter Co. testing bench, which will take eight 5/8-inch meters, or seven 3/4-inch meters, at one time. The flow from the meters under test passes through a quick-closing valve, then through an orifice in a Mueller multiple orifice valve, through overhead piping into a 10-cubic-foot steel tank mounted on platform scales.

The initial water pressure available for test is about 100 to 105 pounds. The outlet pressure on the orifice valve varies with the number and type of meters under test, so that the rate of flow at any given orifice opening has been variable. To correct this condition, a pressure-reducing valve was installed on the outlet end of the string of meters under test, which was set by experiment to 40 pounds pressure. This gives reasonably constant rates of flow for the smaller orifices. For full flow test, the outlet pressures drop to from 7 pounds to 10 pounds, so that there is still some variation in the rates for these test flows, but it is thought that these variations are not important.

In running a series of experimental tests on meters at low rates of flow, it seemed desirable to have a more accurate measure than could be obtained by weighing when the total quantity run was one cubic foot. Accordingly, it has been decided that the one-cubic-foot test will be made volumetrically, using a test can similar to those in use for testing gas-pump meters. These one-cubic-foot cans are also being used in making accuracy test on meters on the consumers' premises.

## Regularity of Testing Meters

Special efforts have been made during the last few years to bring the meter-testing schedule into conformity to the Public Utilities Commission requirement that all meters be tested at intervals not exceeding five years, but there are still a large number of 5/8- and 3/4-inch meters in service which have not been tested within this period.

Formerly, meters removed from service for regular tests were tested at two points only: through a 1/32-inch orifice for registration; and at full flow for percentage registration. Following cleaning and repairing, the same two-point test was repeated. There was no percentage requirement at the low flow, but at full flow a registration of flow 98 to 100 per cent was necessary before the meter could be returned to service.

At present a four-point test is made, the 1/32-inch, 1/16-inch, 1/4-inch, and full-flow orifices being used. The 1/16- and 1/4-inch points were added as a result of the investigations made to determine the actual rates at which meters operate and the desirability of having a meter register accurately at these rates.

The Water Bureau has adopted the following registration requirements for repaired 5/8- and 3/4-inch meters as a result of the studies made on the uses of water through small meters:

| Orifice | Equivalent Flow G. P. M. | Test Quantity | Required Per Cent Accuracy |
|---|---|---|---|
| 1/32" | 2/10 | None | Must Register |
| 1/16" | 7/10 | 1 cu. ft. | 93% or better |
| 1/4" | 7 3/10 | 5 " " | 98%–102% |
| One size larger than meter—(3/4) | 18 | 10 " " | 98%–102% |
| One size larger than meter—(1") | 21 | 10 " " | 98%–102% |

## Results of New Testing Methods

As soon as the new testing procedure was in operation, it was found that about 25 per cent of repaired meters needed re-gearing, and that many of the older meters required new discs and chambers before they would meet the new test requirements. With so many meters requiring new discs and chambers, the practice of fitting these parts at the shop has been discontinued in favor of factory-fitted parts, a policy which in general has produced satisfactory results, both as to the quality of the work and the cost of doing it.

The changes made in testing procedure require somewhat more time than previously, with a resulting increase in testing costs, but it is believed that the increase in revenue due to more accurate registration will more than compensate for the increased cost of testing, besides allowing for a better check on discrepancies between the master meter on the supply lines and the sum of the meters on consumers' premises.

Curve II shows an average registration curve developed from a number of tests on repaired 5/8- and 3/4-inch meters, a summary of these tests being shown in Table D. By applying the percentage of registration shown on the Repaired Meter Curve to the amount of water used, shown in Table B, the resulting percentage of unrecorded water and revenue loss per meter for houses equipped with tank toilets are shown to range from 2 to 3.5 per cent for unregistered water, and from $0.12 to $0.80 per meter per year for loss in revenue. Corresponding figures for houses having flushometer toilets show 1.6 to 2.8 per cent unregistered water, with revenue losses ranging from $0.17 to $0.95 per meter per year.

## Lost Revenue Reduced

A comparison of the losses in revenue, based on tests on meters, taken directly from service and on repaired meters, is shown in Table E, and indicates a reduction in

TABLE D
SUMMARY OF TESTS ON REPAIRED METERS

| No. of Meters Tested | Average Age of Meters (Yrs.) | Percentage Registration 1/32" | 1/16" | 1/4" | Full Flow |
|---|---|---|---|---|---|
| 5/8" Meters | | | | | |
| 28 | 21 | Reg. | 95.8 | 100.6 | 99.7 |
| 3/4" Meters | | | | | |
| 47 | 22 | Reg. | 96.9 | 100.7 | 99.6 |
| Plotting points for 5/8" and 3/4" meters Curve II | | | 95.8 | 100.7 | 99.6 |

TABLE E
REDUCTION IN PERCENTAGE OF UNRECORDED WATER AND IN LOSS IN REVENUE

| Type of House | As Removed from Service Prior to Repairing: % Water Unrecorded (1) | Annual Revenue Loss per Meter (2) | After Repairing Prior to Return to Service: % Water Unrecorded (3) | Annual Revenue Loss Per Meter (4) | % Saving (4) over (2) |
|---|---|---|---|---|---|
| Houses with tank toilets | % | $ | % | $ | % |
| Single | 6.9 | 0.43 | 2.0 | 0.12 | 72.1 |
| Two-Family | 7.3 | 1.14 | 2.0 | 0.31 | 72.8 |
| Three-Family | 11.7 | 2.58 | 3.6 | 0.80 | 69.0 |
| Houses with Flushometer Toilets | | | | | |
| Single | 5.2 | 0.53 | 1.8 | 0.17 | 67.9 |
| Two-Family | 3.3 | 0.62 | 1.6 | 0.30 | 51.6 |
| Three-Family | 9.0 | 2.70 | 2.8 | 0.95 | 64.4 |

revenue loss or reclamation of lost revenues, ranging from about 50 to 70 per cent, which if applied to all ⅝- and ¾-inch meters in service would amount to over $5,000 per year. It should be noted that this indicated saving results largely from higher registration on low flows rather than over-registration at the higher flows to balance the loss on low flows.

From a study of the condition of meters removed from service for regular test, it was found that a very great majority of the meters have been in continuous service for more than five years, and that under-registration was so common a fault as to require replacement of the disc and chamber in seven out of every ten tested, before the meter could properly be returned to service. If the under-registration of these meters had been used on computing loss of revenue, the amount so lost would have been much more than the $11,000 computed above. This indicates most forcefully the desirability from the utility point of view of frequent and thorough rough tests of consumers' meters.

### Summary

The Hartford water system is typical of many other metered systems, and conditions prevailing there are undoubtedly to be found elsewhere.

The investigations discussed in this paper indicate the importance to fully metered water utilities of further studies along the following lines if meter registration, and consequently income, are to be kept at the maximum level consistent with equity between utility and consumer:

(1) Regular testing of all meters in service.

(2) A testing procedure with test points selected to cover the actual rates of flow at which meters ordinarily operate.

(3 A repair procedure which will insure that the measuring element of the meter be replaced before it becomes sufficiently worn to produce excessive under-registration at low flows.

(4) Proper sizing of the meter to adapt it to the service expected.

(5) Slightly higher accuracy requirements for the lower rates of flow in both new and repaired meters than at present obtain under the water association specifications.

(6) Revision of public utility specifications which permit under-registration at low rates without permitting reasonable over-registration at higher rates (New York State).

ACKNOWLEDGMENT.—Abstract of a paper presented before the New England Water Works Association.

# Municipalities Ought to Receive a Larger Share of State Taxes

THAT the states ought to share with the localities the proceeds of certain basic state taxes not generally so shared, was urged last month by Paul Studenski, Associate Professor of Economics of New York University, at the National Conference on Taxation, Readjustment of Governmental Expenditures and Problems of Public Credit.

"These," said Dr. Studenski, "are the proceeds of personal income taxes, corporation taxes, inheritance taxes, and automobile taxes. They should, in many cases, increase the share now offered to the local governments. For example, the local share of automobile taxes might, in many states, well be increased. The states should also share with the local governments whatever new state taxes of substantial importance or increases in existing state taxes they may introduce in the future in order to balance their own budgets. They should not be concerned merely with their own requirements and improvements in their own fiscal systems and leave the requirements of the local governments unprovided for and the defective local fiscal systems uncorrected. Wherever they have not adopted as yet a personal income tax and a corporation tax, they should adopt them so that these taxes may be universalized throughout the country and co-related with the corresponding Federal taxes. They should also increase the amount of state aid furnished to localities for schools and other purposes. Substantial additional revenue may thus be furnished to the municipalities.

"The system of locally-shared taxes has made considerable strides during the past two decades. Whereas in 1912 locally-shared state taxes supplied only 16 million dollars in the country as a whole, or less than 2 per cent of the amount furnished by the local property tax, in 1930 they supplied 383 million dollars, or nearly 9 per cent of the amount furnished by local property taxation.

"The increase in the importance of this source of local revenue represents one of the most hopeful developments in the field of taxation in this country during the past twenty years. Expanded state administration of taxes levied whether in part or in toto for local purposes means more effective administration and collection of taxes, and greater uniformity in taxation throughout the state. The system of sharing taxes secures a closer coordination of the state and local fiscal systems. Unfortunately, the spread of this system has not been sufficiently systematic and rapid. It is to be hoped that it will proceed in a more orderly way and at a more rapid pace in the future."

EXTENT TO WHICH CERTAIN TAXES ARE LOCALLY SHARED*

| | Taxes | Number of States Having These Taxes | Number of States in Which These Taxes Are Locally Shared |
|---|---|---|---|
| | | 1932 | 1932 |
| I | Business taxes: | | |
| | Corporation taxes | 48 | 9 |
| | Public utility taxes | 48 | 42 |
| | Insurance taxes | 45 | 13 |
| | Bank taxes | 48 | 39a |
| | Special business and occupation licenses | 48 | 7 |
| | Chain store taxes | 13 | 3 |
| | Manufacturers' tax | 1 | 1 |
| | Cotton manufacturing tax | 1 | 1 |
| | Wharfage tax | 1 | 1 |
| | Severance taxes | 14 | 7 |
| | Forest taxes | 16 | 9 |
| II | Personal taxes: | | |
| | Income taxes | 21 | 8-11b |
| | Poll taxes | 43 | 42 |
| III | Inheritance taxes | 47 | 9-12c |
| IV | Automobile taxes: | | |
| | Motor vehicle taxes | 48 | 24 |
| | Gas taxes | 48 | 30 |
| V | Taxes on exchanges and consumption: | | |
| | Mortgage recording tax | 8 | 6 |
| | Sales tax | 9 | 1 |
| | Cigarette and tobacco taxes | 13 | 3 |

a—The amount of bank taxes remitted to the local government is small due to the fact that only the tax on the shares held by residents in the locality is returned by the state. The largest part is, therefore, kept by the state.

b—In three states, local communities share in the State-School or Charity fund which receives a part of the inheritance tax.

c—In three states, local communities share in the State-School fund which receives a part of the inheritance tax.

* Prepared by John A. Bryson, Department of Economics, School of Commerce, Accounts and Finance, New York University.

THE CURTISS WRIGHT FLYING SERVICE WAITING ROOM, HANGAR AND REPAIR BASE AT THE MIAMI MUNICIPAL AIRPORT

# Miami Has an Organized System of Airports

*By* A. H. HEERMANCE

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MANY years ago, the city of Miami entered upon a period of aviation development which made it necessary to find a system to supplant the old idea of a single municipal airport trying to supply the varied needs of a well-rounded aviation expansion. The main link in this system of airports is the municipal field which was given to the city of Miami by the aviation pioneer, Glenn H. Curtiss. He presented the city with a splendid naturally drained area of 160 acres, and later increased the size so that the actual flying area is a half-mile wide and three-fourths of a mile long.

The field is laid out with the long axis in the direction of the prevailing wind. To protect the field against the loss of effective flying area by the erection of dangerous obstacles outside the field, a strip of land was secured, two blocks wide, on both the west and north boundaries, the east boundary being protected by a railroad, and the south boundary by a canal.

### Lighting and Safety Equipment

Because Miami is the southern terminus of the United States Department of Commerce Airway leading from Canada to Florida, it was deemed advisable to install complete lighting equipment as soon as possible. This was done at a cost of approximately $15,000 and includes boundary lights, rotating beacon, and field floodlights. The wisdom of this policy was brought out during the speeding-up of air-mail schedules, bringing planes in and out after dark. A steel hangar was built by the municipality, and with this encouragement the Curtiss Wright Flying Service built one of the finest combination hangars and repair bases in the South, on land furnished on the municipal airport.

In the interest of public safety, a steel fence, with posts set in concrete, was erected along the boundaries of the field that were not protected by the railroad and canal. This proved one of the best investments on the airport, because without the fence it was impossible to police such an area except at a cost which would be out of proportion to the limited Aviation Department budget.

The Commissioners of Dade County aided the airport by constructing two rolled rock runways, placing them in the form of a cross, which gave heavily loaded planes ample facilities for taking-off and landing into the wind. Owing to the trade wind, 75 per cent of the take-offs and landings are in one direction, that is, southeast, so that it was not a difficult engineering job to lay out the runways. Since this construction, the Bermuda grass surface of the remainder of the airport has constantly improved. Comparatively little fertilizer has been used, because of expense, and the watering has been taken care of by the tropical showers which occur during the summer time.

### The Lighter-Than-Air Base

Not long after the construction of this airport, the need was felt for a lighter-than-air base, and the City Commissioners secured a dirigible hangar which had formerly been used by the Navy, and erected it on a suitable piece of ground surrounded by a municipal golf course. This not only provided a well-sodded field, but gave ample protection against the erection of obstacles which might be dangerous to flying, because the city owned the surrounding golf course. This dirigible base was then used very successfully by the Goodyear Zeppelin Corporation in the training of lighter-than-air pilots, many of whom were members of the Naval Reserve Aviation Branch, and supplied material from which the crews for the Los Angeles and Akron drew their share of lighter-than-air specialists.

### The Naval Reserve Aviation Base

About this time, efforts which had been put forth for some time by naval pilots residing in the Miami area were rewarded by the establishment of a Naval Reserve aviation base in this area. Land was secured for this purpose by the city of Miami, and a substantial hangar was

THE MIAMI SEAPLANE BASE OF THE CURTISS WRIGHT FLYING SERVICE, LOCATED IN THE HEART OF THE CITY

erected to take care of the Reserve planes. In the case of the Navy planes, as also with the dirigibles, it was considered inadvisable to have them operate off the municipal airport. That arrangement has been made in certain cities, but the Miami Municipal Aviation Board felt that it would decrease the Navy's expansion program to have them forced to operate off a field upon which they could not entirely control the traffic. The wisdom of this has been proved by subsequent developments.

### Commercial and Government Airports

While Eastern Air Transport was developing the passenger and mail business between New York, Atlanta, Jacksonville, and Miami, Pan American Airways had developed into the world's largest air line by operating to foreign countries southward out of Miami, which was its northern base. They purchased land and built one of the most beautiful and efficient airports in the country, fifteen minutes from the hotel and business center of Miami. To fill their needs for a flying boat base, they leased a strategically located piece of property on Biscayne Bay, and now have in course of construction one of the finest seaplane bases in the world. Their combined equipment for the land-plane base and seaplane base offers unequaled facilities for maintenance and repair of their fleet of over one hundred multi-motored air-mail and passenger planes.

After five years of work by Army officers and citizens of the Greater Miami area, Chapman Field, a war-time Army aviation base, has now been reopened to provide a temporary base for machine-gun and bombing practice throughout the winter months. Squadrons from northern fields can fly down on training flights, carry on their regular maneuvers, and fly back to their northern bases with less expense to the Government than to attempt practice hampered by uncertain weather conditions and the too thickly populated areas which surround practically every one of the present Army fields; owing to the fact that most of them were chosen during the war and the past decade of rapid expansion, many of them are surrounded with farms or the suburbs of adjacent cities.

Private airplane operators have built other airplane and seaplane bases in the Greater Miami area, bringing the total up to fourteen land and seaplane bases. Noteworthy among these is the Viking Land and Seaplane Base, which is but two minutes from the center of town. The Curtiss Wright Flying Service has one of the largest seaplane ramps on the Atlantic coast. The base is equipped with an office and waiting-room which supplies sufficient space for customs officers, and a stock of spare parts, and equipment for the types of planes sold and serviced there.

This system of airports gives the Greater Miami area a well-rounded aviation development which enables the various branches of the Government and private airplane corporations to carry on their work and enjoy natural growth without interference from unrelated activities. City planners have now reached the conclusion that the answer to the intricate problems introduced by rapid aeronautical progress can be answered only by a complete airport system.

THE LAND AIRPORT OF THE AMERICAN AIRWAYS SYSTEM AT MIAMI

# Charges for Sewerage Service

*By* SAMUEL A. GREELEY
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THE purpose of sewer rentals or charges for sewerage service is to provide an equitable distribution of the cost of providing and maintaining such service. These costs include the operating expenses and certain fixed charges arising, chiefly, from the cost of financing the project comprising the annual requirements for bond interest and serial retirement; or, in the case of a private utility, the fair return on the value of the used and useful property plus a depreciation allowance.

In many cases under municipal operation, the entire annual cost of sewerage service is raised by taxes levied on the assessed valuation of property without other regard to the service rendered in return for the tax contribution. In some situations sharp inequalities in the annual contribution of users appear to have resulted, which have tended to be unreasonable and possibly discriminating. R. C. McMillan (Proceedings, Illinois Association of Sanitary District Trustees, May, 1926) has stated: "There is a certain equity in favor of one who has been taxed for the cost of a sewer or disposal plant that he be permitted to enjoy the benefit of it. The industry has a common right with other property owners to the use of the plant, but when that use becomes extraordinary . . . the municipality has a right to charge for that extra use made by the industry. Where industrial sewage waste would render a plant entirely inadequate for the public use for which it was constructed, it would amount to confiscation of public property for private use."

When the annual cost of sewerage service is covered entirely by taxes, vacant as well as occupied land contributes in proportion to its assessed valuation. There is equity in this, in so far as there is a general benefit to the entire community from sewerage and sewage disposal. The usefulness, and hence the value, of land is increased and secured by the mere existence of these works ready to serve. The entire community gains by the protection to health and the availability of safer waterways for recreation.

### Distribution of Costs

Pertinent considerations are (1) what portion of the cost should be carried by users and what portion by property both used and unused; and (2) how the contribution of users should be distributed.

Sewer rentals or rates of charge for sewerage service have been established in many cities. In some, the income from rates is sufficient only to meet operation expenses, the balance of the total annual cost being paid out of tax money; while in others the total annual cost is carried by the income from rates. Between these two limits are many intermediate situations.

The question of policy will sometimes arise as to the expediency of providing sewerage service for large users at public expense. In some situations, particularly in England, special agreements or contracts are made between the industry and the municipality whereby for an agreed consideration the municipality receives and treats the industrial sewage. In special situations in the United States, the industry has undertaken to regulate its waste, and reduce or eliminate the pollution from its discharge.

### Rentals Legalized in Massachusetts

Rates of charge for sewerage service have been collected for many years by a number of Massachusetts cities. Section 23, Chapter 83, of the General Laws of Massachusetts provides that any city or town shall pay "not less than one-quarter nor more than two-thirds of the cost of laying out, constructing, maintaining and repairing the common sewers" from the general tax. The remainder must be financed by assessment on the abutter or by rental against the user. The Enabling Act in Massachusetts provides for "just and equitable annual charges for the use of common sewers, which shall be paid by every person who enters his particular sewer therein. (Section 16, Chapter 23.) The money so received may be applied to the payment of the cost of maintenance and repairs of such sewers, or of any debt contracted for sewer purposes."

This section of the General Laws was declared to be constitutional thirty years ago by the full bench of the Supreme Court of Massachusetts and affirmed by the U. S. Supreme Court in 1901 (*William H. Carson v. Sewage Commission of Brockton*, 175 *Mass.* 242), the gist of the opinion being as follows:

A sewerage system is a benefit to the health of the whole community; therefore, some proportion of its cost should be paid for by general taxation. The owner of land receives a particular benefit if a sewer is laid by his land; therefore, he should pay an assessment for his special benefit. If the cost of building the sewer is a special benefit, keeping the sewer in condition for use is a further special benefit to those who use it. Hence, a sewer rental charge for its use is just and equitable.

Brockton, Mass., pays for its sewerage service by a use charge and a tax levy. The use charge is 15 cents per 100 cubic feet of water entering the sewer (based upon meter readings of the water department), which assumes that the sewage quantity is apportioned amongst users in accordance with the water consumption. The income from taxes is derived from a general tax and a frontage assessment. The published annual reports give the income and expenses for sewerage service, including sewage disposal, in that city since 1892 as follows:

| Income | | Expenses | |
|---|---|---|---|
| *Source* | *Per Cent of Total* | | *Per Cent of Total* |
| Sewer rentals | 59.5 | Operation and maintenance | 38.8 |
| General tax | 39.5 | Bond retirement and interest | 61.2 |
| Miscellaneous | 1.0 | | |
| | 100.0 | | 100.0 |

### Sewer Rentals Permitted in 22 States

Twenty-two states have some kind of enabling acts for sewer rentals. One of the earliest and most widely applied is that of Ohio. Under its provision the sewerage system does not become a utility and the State Utility Commission does not supervise the rates. Each city may charge as it sees fit and establishes the rate by local ordinance. No rate schedules in Ohio have, as yet, been reviewed by a state board or court. The pertinent section of the Ohio Act is as follows:

"The council of any city or village which has installed or is installing sewerage, a system of sewerage, sewage pumping works or sewage treatment or disposal works for public use, may by ordinance establish just and equitable rates or charges of rents to be paid to such city or village for the use of such sewerage, a system of sewerage . . . by every person, firm or corporation whose premises are served by a connection to such sewerage . . . or disposal works.

"The funds received . . . shall be used for the payment of the cost of the management, maintenance, operation and repair of the sewerage system . . . and disposal works and any surplus may be used for the enlargement or replacement of the same and for the payment of the interest on any debt incurred for the construction of such sewerage system . . . and disposal works, and for the creation of a sinking-fund for the payment of such debt, but shall not be used for the extension of a sewerage system to serve unsewered areas. . . ."

The great variety of rate structures used, the wide range in the ratio of annual incomes to total annual costs and the paucity of opinions by commissions and courts, point clearly to the need of a further development of the subject. Fundamental considerations appear to have been given too little weight. Municipalities considering the establishment of sewer rentals or charges for sewerage service should seek the advice of qualified engineers experienced in this field.

### Typical Rate Schedules

Typical rate schedules were published in THE MUNICIPAL INDEX for 1930 for 109 cities in 22 states. The methods of charging for sewerage service as indicated by this list are as follows:

1. Annual flat rate charge for connections outside city limits
2. Flat rate annual charges for residences and business houses
3. Flat rate charge according to number of fixtures
4. Percentage charge of water bill
5. Unit charge upon metered water consumption
6. Added tax rate on assessed valuation
7. Charge according to number of rooms in dwelling and business house.
8. Unit charge per lot
9. Actual cost of treatment and maintenance
10. Charge per lineal foot of property
11. Charge according to character of sewage
12. General tax, betterment assessment, and sewer rental based on water consumption

According to the schedules listed, flat rates ranged, in general, from $6 to $18 per connection per year; and unit rates from 7.5 to 25 cents per 100 cubic feet of water consumed. In Ohio, in 1928, sixteen cities used the following types of rate structures:

| *Basis* | *Number of Cities* |
|---|---|
| Volume of water | 5 |
| Flat rate per sewer connection | 4 |
| Number and kind of fixture | 2 |
| Size and kind of sewer connection | 5 |

Dayton, Ohio, makes the following charges:

| *Quarterly Consumption* | | *Basis of Quarterly Charge* |
|---|---|---|
| 0— 22,500 gallons | @ | $0.044 per 1,000 gallons |
| 22,500— 75,000 " | @ | 0.04 " " " |
| 75,000— 150,000 " | @ | 0.033 " " " |
| 150,000— 750,000 " | @ | 0.026 " " " |
| 750,000—3,750,000 " | @ | 0.02 " " " |
| 3,750,000—plus | @ | 0.013 " " " |

Dayton provides only partial treatment of the sewage, the treatment work comprising Imhoff settling tanks and appurtenances. The annual income from rates amounts to about $245,000, which is usually somewhat more than the operating and maintenance costs and thus provides a balance which can be used for meeting fixed charges.

### Private Utility Rates

There are a number of privately owned and operated sewerage utilities in this country, the majority of them being in New Jersey and in Texas. The Lakewood Water Company, also giving sewerage service, has had its value and rates reviewed by the New Jersey Board of Public Utility Commissioners (1927 E—P.U.R., p. 71.) The Commission fixed the value of the water and sewerage properties at $1,100,000 and approved a rate structure on the following computation of income and expenses:

| | | |
|---|---|---|
| ANNUAL INCOME | | |
| *Water* | | |
| 630 minimum collections @ $15 | $ 9,450 | |
| 839 service charges (bills exceeding the minimum) | 11,222 | |
| Consumption | 55,701 | |
| | | $ 76,373 |
| *Fire Service* | | |
| 142 hydrants @ $10 | $ 1,420 | |
| 658,252 inch-feet of mains @ $0.0125 | 9,603 | |
| | | 11,023 |
| *Sewage* | | |
| 460 minimum collections @ $11 | $ 5,060 | |
| Service charges (bills exceeding the minimum) | 6,681 | |
| Quantity charges | 27,909 | |
| | | 39,650 |
| Total annual income | | $127,046 |
| ANNUAL EXPENSES | | |
| Operation | $31,000 | |
| Taxes | 17,304 | |
| Depreciation | 9,600 | |
| Return allowed (6.3% of $1,100,000) | 69,142 | |
| | | $127,046 |

The rates allowed for sewerage service in this case by the New Jersey Commission are as follows:

SCHEDULE FOR SEWERAGE SERVICE

(1) Rate:
A service charge of the following rates per month:

| *Size of Water Meter* | *Sewer* |
|---|---|
| ⅝ in. | $0.30 |
| ¾ " | .55 |
| 1 " | 1.10 |
| 1½ " | 3.00 |
| 2 " | 4.00 |
| 3 " | 8.00 |
| 4 " | 14.00 |
| 6 " | 22.00 |

(2) Plus
A consumption charge

| | *Per M. Gal. Used per Month* |
|---|---|
| For the first 16,500 gallons | $0.20 |
| For the next 150,000 gallons | .15 |
| For the next 333,500 gallons | .10 |
| For excess over 500,000 gallons | .07 |

(3) Minimum Charge
For ⅝-inch and ¾-inch meters, $0.90 per month, but in no case less than $10.80 per annum.
For all other size meters, the service charge shall be the monthly minimum charge, but in no case less than the annual service charge.

ACKNOWLEDGMENT.—Reprinted from *The Municipal Index* of 1932.

# Bituminous Street Paving Has Provided Unemployment Relief at Low Cost in Austin, Texas

*By* H. R. F. HELLAND
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USING the proceeds of a $4,250,000 bond issue voted in May, 1928, for street improvement, sanitary sewers, parks and playgrounds, schools, fire stations and other items, the city of Austin has carried on an extensive improvement program during these years of depression, thus providing work for many of its citizens, as well as receiving the benefits of low construction prices prevailing during this period.

Of the total bond issue, $2,000,000 was voted for street-improvement work, under which was included the cost of storm sewers, bridges, drainage work, resurfacing of old paved streets, the city's part of new paving construction cost, and the cost of land or easements required for certain portions of the work. Expenditures for the city's part of new paving construction and for resurfacing old streets totaled approximately $855,000.

### Division of Paving Costs

Paving costs were divided between the property owners and the city. The city paid the total cost of paving street intersections plus a certain percentage of the cost of paving in front of abutting property. This percentage was on a sliding scale as follows: 10 per cent on streets 50 feet or less in width between curbs; 12.8 per cent on streets 60 feet in width; 18.2 per cent on streets 70 feet in width; with a maximum of 33 1/3 per cent paid on one 90-foot street. The property owners were required to pay the cost of constructing curbs and gutters in front of their property. With the varying percentages as given above, the city's part of the cost of paving on the individual streets or units of construction varied from 10 per cent to 57 per cent of the total cost of such construction units, the percentage depending, of course, on the width of street, intersections included, and incidental work necessary. Considering the total new paving constructed, the city paid 30.6 per cent of the total cost, this percentage not including payments made by the city as a property owner, that is, for paving abutting city-owned property. The city's part of the paving cost was paid to the contractor in cash on monthly estimates. The property owner's portion of the cost was payable in six equal instalments, the first due within thirty days after the street was accepted by the city, and the balance in one, two, three, four and five years. Delayed payments carried interest at 7 per cent.

### Basis of Program

In carrying out the paving program a study was first made of traffic needs and a paving schedule laid out. This schedule provided as closely as was practical for, first, the early improvement of primary traffic arteries carrying highway traffic into and through the city; second, the improvement of important traffic arteries within the city; and, last, the improvement of secondary or residential streets. The systematic carrying-out of this schedule gave rise to many favorable comments from both citizens and visitors.

The greater part of pavement existing in the city of Austin prior to 1928 is bitulithic, laid in the years 1912 to

TYPICAL BOULEVARD PAVING ON EAST 15TH STREET, AUSTIN, TEXAS

SOUTH CONGRESS AVENUE, AUSTIN, TEXAS, MEASURING 90 FEET BETWEEN CURBS
Note the State Capitol in the background

1917. Since 1917 a very small amount of pavement has been laid. In view of the excellent service record of the bituminous pavement laid prior to 1917, over two-thirds of the pavement laid under the 1928 bond issue is Warrenite-Bitulithic pavement.

Bids received on 2-inch bitulithic pavement on 5-inch and 6-inch concrete bases in 1929, 1930 and 1931 are shown in the following tabulation:

| *Date Bids Received* | *2" Warrenite-Bitulithic on 5" Concrete Base* | *2" Warrenite-Bitulithic on 6" Concrete Base* |
|---|---|---|
| April 19, 1929 | $2.05 | $2.20 |
| April 17, 1930 | 1.80 | 1.95 |
| February 26, 1931 | 1.70 | 1.85 |

On November 28, 1931, the University of Texas received bids on Waller Boulevard through University Grounds from 19th to 26th Streets. This work included 23,590 square yards of bituminous pavement. Contract was awarded on 2-inch bitulithic on 5-inch concrete base at $1.43 per square yard. This work will be all paid for in cash, the city of Austin paying 25 per cent of the cost from general taxes.

A total of 341,482 square yards of 2-inch pavement of the same type on 5-inch concrete base, 213,925 square yards of 2-inch pavement on 6-inch concrete base and 7,975 square yards of 2-inch pavement on 8-inch gravel base will have been constructed since 1929 when two projects now under construction are completed.

### Construction Data on Base and Surface Courses

The concrete base was proportioned in accordance with the water-cement ratio so as to produce 1,750-pound concrete. This strength was raised to 2,000 pounds in the 1930 and 1931 specifications. The aggregates used were washed and screened sand and gravel obtained locally in the Colorado River. The bituminous surface was, in all cases, 2 inches thick. Crushed limestone or crushed gravel was used in the coarse surfacing mixture. The limestone was shipped into the city, and the crushed gravel was produced locally. There are no noticeable differences in the results obtained by the use of these two materials. Asphalt used in the surfacing mixtures was 45 to 55 penetration in the coarse mixtures and 80 to 90 penetration in the fine mixtures. On certain of the streets where steep grades occurred a granular or non-skid surface was given to the pavement.

### The Principal Streets

The most noteworthy as well as the most beautiful streets in Austin have bituminous pavement. South Congress Avenue, extending from the Colorado River to the south city limits, a distance of 6,944 feet, is 90 feet between curbs and is the extension of the main business street of the city, leading directly to the State Capitol Building. East Twelfth Street, extending from the east entrance of the State Capitol Grounds to East Avenue, a distance of 1,914 feet, has two 24-foot driveways and a 28-foot center parkway. This street is a companion street to West Twelfth Street, which was paved in much the same manner in 1915. East Avenue from Fourth to Nineteenth Streets, a distance of 5,504 feet, is 200 feet wide between property lines and, depending on the topography of the ground, is paved with two driveways varying in width from 20 feet to 46 feet with a wide parkway in the center. Fifteenth Street from East Avenue to West Avenue, a distance of 5,207 feet, has two 26-foot driveways and a 23-foot center parkway.

Waller Boulevard, now being constructed through University of Texas property from 19th to 26th Streets, will become the main north-and-south traffic artery for that portion of the city. It is 56 feet between curbs and 3,985 feet long, and, following the meanders of Waller Creek, is destined to become a beautiful as well as a most important driveway.

### Surface Treatment

In addition to the new paving work above described, approximately 80,000 square yards of old bituminous pavements laid prior to 1917 are being given a surface treatment. The greater part of this old pavement had received little, if any, maintenance since it was first laid. The streets are first thoroughly cleaned, excess oil, dirt and grease removed, and cracks cleaned out and filled with a fine surfacing mixture. The entire street is then given an asphalt priming coat, which is thoroughly broomed to insure its penetration into the old roadway surface. The primary coat is allowed to dry for at least thirty minutes until the asphalt is slightly sticky. It is then covered with a second asphalt flushcoat applied with squeegees at a temperature between 250 degrees and 350 degrees Fahrenheit. Immediately after the second application of asphalt a uniform layer of coarse dry sand is

spread. Sufficient sand is used to absorb and take up the asphalt coat, so that no asphalt shows through the sand layer. The street is then rolled and opened to traffic. From time to time as needed the sand is spread or brushed back on the pavement until as much as possible has been taken up by the asphalt. It is expected that this treatment will give a number of years' additional life to the old pavement. The contract price of the work is $0.15 per sq. yd.

The contract for the Warrenite-Bithulithic pavement and for the flushcoating is being executed by the Southwest Bithulithic Co., San Antonio, Texas. Texaco asphalts were used throughout the work. The author is the consulting and supervising engineer. L. M. Chokla, of Austin, is paving engineer.

# A Real Home-Rule County-Manager Charter

*By* **FRANK M. McVEIGH**
**Secretary, San Mateo County Charter Study Committee**

NOW that the general election is history, the eyes of the nation will be focused upon San Mateo County, California, not because of the presidential returns, but for the reason that San Mateo County has adopted a county charter that is believed to be the greatest advancement in county government in the United States to date. This charter will become effective July 1, 1933.

The charter was adopted at the general election by an overwhelming vote of two to one, only after a strenuous campaign which successfully subdued the political opposition that was directed against the charter. Politicians and certain office-holders bitterly opposed it and resorted to all sorts of tactics to defeat its adoption. Misstatements and misinformation were released by them.

We, in turn, organized a Citizen's Charter Committee and launched a campaign that was successful in answering attacks. A speakers bureau arranged for speakers to address virtually every organization and group in the county; all the newspapers, except two small weeklies with small circulations, gave hundreds of inches of publicity favoring the charter in the news and editorial columns, and more than sixty thousand cards and dodgers were distributed throughout the county in our campaign to have the charter adopted.

The adoption of the county charter culminates a year's work on the part of a group of over one hundred citizens who worked earnestly and honestly to bring the needed reform in our county government.

With the adoption of the charter, San Mateo County has definitely established home rule in the management of its county affairs and has taken away from the State Legislature the right to determine how the county shall function. Prior to the adoption of the charter the Legislature had the power to determine the organization of the county government, the salaries we should pay our county officials, the number of deputies that may be employed in the various departments and the salaries of these deputies. The only privilege that our citizens enjoyed was the right to elect officials to the particular offices which the State Legislature demanded that all counties should have.

The counties in California are victims of a constitutional amendment which specifies that the State Legislature "shall establish a system of county governments, which shall be uniform throughout the state . . . .," resulting in the fact that all counties, without charters, must have the same form of government irrespective of size or needs. The adoption of a charter is the only means through which the citizens of a county may improve their county government.

San Mateo County, with the adoption of its charter, is the only county in California that will have a county-manager form of government. We are informed that it is the second county in the nation to provide for a truly county-manager form of government.

## Provisions of the County Charter

### THE COUNTY EXECUTIVE

San Mateo County's charter provides for the appointment of a county executive (county manager) by the board of supervisors. In order to give assurance that a competent executive will be appointed to this important post, the charter provides for a qualification board or a civil service board to pass upon the qualifications of all applicants for the position of county executive. Because of the limited number of county employees, the Board of Freeholders did not believe that a civil service board for all employees should be created.

This qualification board consists of five members, namely, two superior court judges, the county superintendent of schools, a layman appointed by these three and a layman appointed by the board of supervisors. The qualification board solicits and obtains applications for the position of county-executive.

It is the duty of the qualification board to pass upon the qualifications of all the candidates seeking this post, and to submit to the board of supervisors the names of five, and not less than two, of the candidates possessing the highest qualifications. The board of supervisors then appoints one of these candidates who has successfully passed the qualification board. In the event that the board of supervisors cannot agree upon the appointment of any of the candidates submitted by the qualification board, the board of supervisors may request another group of names.

The county executive is appointed by a four-fifths vote of the board of supervisors for a four-year term at a minimum salary of $6,000 a year. The executive may be removed by the board of supervisors by a four-fifths vote, only after charges have been filed against him at a public hearing.

The county executive shall be responsible for all administrative details of the county. He will have to make a number of appointments of department heads. His appointments, however, must be confirmed by the board of supervisors.

### OTHER COUNTY OFFICIALS

Five of the county officials who are now elective are made appointive by the county executive under the charter. These officials are coroner and public administrator (combined office), recorder, treasurer, tax and license collector (combined office), and engineer-surveyor (combined office). The other appointments of the county executive are purchasing agent, building inspector, board of health and welfare, director of health and welfare and a recreation commission.

The elective county officials are clerk, assessor, controller, district attorney, sheriff, justices of peace, superior judges and county superintendent of schools.

The Board of Freeholders in their deliberations determined that those officers whose duties were of a clerical and administrative nature should be appointive by the county executive, while those officers whose duties required certain public policy-determining factors should remain elective.

The chart below gives an outline of the organization of the proposed county charter government for San Mateo County.

### THE BOARD OF SUPERVISORS

Under the county charter the board of supervisors will be directly responsible for the affairs of the county. At the present time, we have five supervisors, who are elected from supervisorial districts and who serve as road commissioners for their respective districts. Under the charter there will be five supervisors, each of whom must come from a district, but who will be elected by the voters of the county at large instead of only by the voters of their district.

This provision of electing district supervisors by the voters of the county at large was adopted in a unique manner and should be given an explanation. Under the state constitution, it is mandatory that each district have a supervisor, but permission is given to have a supervisor elected by the district vote or the county vote. Being unable to agree as to whether the supervisors should be elected by the voters of their respective districts or by the voters of the county at large, the Board of Freeholders took advantage of a provision of Section 7½ of Article XI of the state constitution which states that "in submitting any such charter, any alternate article may be submitted for the choice of the electors, and may be voted on separately without prejudice to the other." Under this provision, the Freeholders submitted an alternate article to the voters of the county at the same time that the charter was submitted. The charter provided for the election of the supervisors by district vote, while the alternate article provided, just oppositely, for their election by vote at large. This alternate article was adopted by a majority vote, so it takes the place of the provision in the charter which provides for the election of the supervisors by district vote.

The charter provides that the board of supervisors shall, by ordinance, determine the salaries to pay all county officials other than themselves. Their salary is fixed at $150 a month. The board of supervisors shall also, by ordinance, determine the number of clerks and deputies to be employed by the county, and their salaries. This takes this matter out of the hands of the State Legislature. To give protection to the county officials, a minimum salary is specified, based upon 1929 compensation.

The board of supervisors will be purely a legislative body with no administrative functions.

### ROADS—HEALTH AND WELFARE

The supervisors will not serve as road commissioners under the charter. The management of the county roads will be placed under the direction of the county engineer, and the purchase of supplies for the roads will be made by the purchasing agent and not by the members of the board of supervisors, as was the former system. All roads will be classified, and road construction and maintenance will be done in accordance to the needs and not in consideration to the supervisorial district lines.

All the health and welfare functions are coordinated under the direction of a director of health and welfare, who will have an advisory board of health and welfare. At the present time, our charity, health and hospitalization functions are managed by separate heads, with the board of supervisors attempting to serve in a coordinating capacity. This method of functioning has never proved successful or efficient. Under the charter, these three closely dependent functions are centralized.

### COURTS AND CONSTABLES

The inferior judiciary system is improved under the charter. At the present time, we have six judicial townships with eight justices of peace. The charter provides for five judicial townships with one justice of peace for each township. They are made elective by the voters of their respective townships.

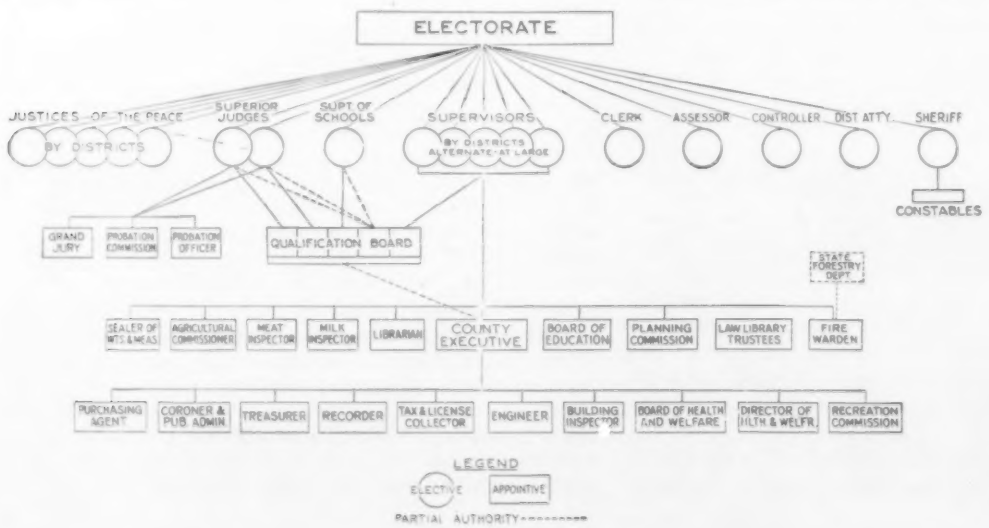
Under the charter the sheriff shall appoint the necessary number of constables instead of having them made elective as at present. The constables are made ex-officio deputy sheriffs.

### ECONOMY AND EFFICIENCY

The charter provides that all fees collected by county officials shall be turned into the county treasury, and makes it mandatory that all officials shall devote their entire time to county work, thus eliminating all private practice formerly permitted.

The citizens of San Mateo County expect efficiency through the charter. It can readily be seen that economies will be made in the road department, health department and purchasing department. Savings will be made by reducing the number of justices of peace and constables, and the fees being turned into the county treasury will bring added revenue.

As our county superintendent of schools has no administrative functions and serves as a curriculum director and representative of the State Board of Education to the various school districts, this office was continued as an elective one. The state law prescribes that the superior judges should be elective, so no change could be made here.




ORGANIZATION OF THE GOVERNMENT OF SAN MATEO COUNTY, CALIF.

# Fair Play in Paying for Improvements

*By* HERBERT S. SWAN
City Planner

HOW to finance the cost of city development and growth, how to provide the wherewithal to pay for improvements necessary to keep the community abreast of the times, is one of the most difficult and baffling problems in the whole field of municipal administration. Our past lack of comprehensive city planning has of course served to make these problems still more difficult of solution.

Our cities, having had no comprehensive plans, have undertaken many ill-advised improvements. Because of their piecemeal and unrelated execution, such projects as have been carried out have not always blessed neighboring property with anticipated increases in value. The lack of a physical plan to guide future growth and development has effectively blocked the evolution of an all-inclusive financial plan. In the absence of a city plan, of course no city could formulate a rational program for meeting the financial requirements exacted by changing conditions and increased growth.

With the adoption of a city plan, however, many things which were formerly impossible become possible. First of all, a plan gives a city a picture of its future needs; the problems affecting its prospective development are analyzed; the improvements required to supply its present and prospective wants are worked out so that henceforth it has definite, concrete ideals to strive for. It at least knows what streets should be widened; what new streets should be laid out and how wide they should be; what parks and playgrounds should be acquired and where they should be located; and a hundred-and-one other matters relating to its growth.

Having this picture of its future self, a city has for the first time the necessary means of formulating an intelligent and rational financial program to deal with the cost of all these various improvements. It can now visualize the relationship of different improvements so that mutually interdependent projects may, as nearly as possible, be carried out at one time; it can more accurately gage the timeliness of improvements so that the more urgent can be granted precedence over the less urgent; in short, it can at last substitute practical business sense for hit-or-miss guesswork.

In the evolution of the long-term financial program designed for carrying out the numerous projects embraced in the city plan, it is only natural that the position occupied by benefit assessments in the financing of improvement should be restudied with a view to redefining their place in the new order of things. The purpose of this paper is to discuss certain aspects of benefit assessments in so far as they relate to street widenings and extensions. The conclusions arrived at are, however, in most cases just as applicable to parks and playgrounds, and in many cases to such other assessable improvements as tunnels, transportation lines, sewers, water mains, street pavements and like projects.

Because of the limitation imposed on account of space, the technic of spreading assessments of different kinds will not be considered at all. Involving as it does a consideration of the front-foot rule; the area rule; the special treatment to be accorded corner lots, shallow lots and especially deep lots; the prorating of assessments over primary and secondary zones of benefit; and a score of other problems, this is a subject of so many ramifications that it merits individual attention.

## Assessments of Full Local Benefit

Assessment of the full amount of local benefit up to the cost of the improvement would probably go further than almost any other measure that might be proposed in limiting the improvements undertaken to really timely and necessary projects.

The general taxpayer has not yet come to realize that the under-assessment of the full amount of local benefit is really unfair discrimination against him. Instead, he rather views the system that permits such under-assessment as a beneficent lottery that may some day, without cost to him, increase the value of his own parcel. And at that he probably lets the matter rest—much to his own loss. Getting something for nothing almost invariably breeds extravagance and waste. Costly improvements of local benefit are of course popular when paid for by somebody else; so long as they can be got for almost nothing, it is a safe bet that there will be plenty of owners who will try to get them. And it may also be taken for granted that the boys in the council who vote them will be the ones who will have the most ardent and liberal friends at election time.

## City Aid in Financing Improvements

Pursuance of a fair policy of special assessments would confine the city aid extended in any project to the amount by which estimated local benefits failed to equal the cost. As the benefits in the vast majority of cases would be expected greatly to exceed the cost, there would be relatively little city aid extended in carrying out any particular improvement. But the aggregate city aid extended over a period of years would nevertheless, on account of the number of projects undertaken, be quite large.

It is always difficult to carry out a street widening or extension. Property owners, instead of voluntarily assuming the cost themselves in the way of benefit assessments, almost always attempt to saddle it upon the city at large. Although this is perfectly understandable behavior on their part, it nevertheless frequently results in nothing at all being done in the way of thoroughfare improvement. The consequence is that they themselves are most often among the chief losers. In trying to evade the costs of the street widening or extension, they also deprive themselves of the benefits conferred by the new or wider streets.

Of course, no property owner can afford to have practically his entire parcel taken for street-widening purposes. But such cases are, despite the large number of triangles, gores and trapezoids left by street improvements, far from normal. In the great majority of cases a widening affects only the front 10 or 15 feet of the normal lot. It therefore generally leaves, after the widening, a lot of sufficient depth to be improved with an economic building. Where this is so, property owners, instead of giving up valuable frontage, in effect merely give up rear land, land which in many instances they would not use anyhow. The remainder of the lot, moreover, instead of being destined to remain low-value property owing to its fronting upon a street only 30 or 40 feet in width, will, through the widening and the inevitable improvement resulting in its environment, become property of an entirely

different kind, and therefore decidedly more valuable. For instance, can there be any doubt that a 135-foot lot fronting upon a 60-foot street would generally possess greater value than a lot having a 150-foot depth fronting upon a 30-foot street?

Property values are exceedingly interesting phenomena. Property is seldom valuable for business purposes just because it is in proximity to the downtown business district. Usually property possesses such value as it enjoys for business purposes, not because of physical nearness to the business district, but because of its availability for business development. In scores of cities, illustrations can be pointed out where property, although lying within a few hundred feet of the principal downtown street where property possesses a value of thousands of dollars per front foot, is nevertheless worth only fifty, sixty, or at most a few hundred dollars per front foot.

In no case, probably, is this more true than among the narrow streets situated in the vicinity of the downtown business district of a city. How often are these thoroughfares, because of their broken connections and narrow widths, pocketed, as it were, from the main line of business growth. Their inadequate thoroughfare connections shut them off from their logical business development. In so far as they are used for business purposes, their development is largely of secondary character with low rentals and low values. Indeed, the difficulty in securing tenants for buildings on many of these streets is such that the property is left either undeveloped or developed with old and obsolete buildings that hardly pay their carrying charges.

As a safeguard against granting a disproportionate amount of city aid, the general taxpayer should be extended the same rights in appealing against an under-assessment of benefits as is accorded the individual property owner in the case of an over-assessment of benefits. The property owner who is assessed local benefits can usually be counted on to protest the assessment as being too high. To maintain a full assessment of benefit, in the face of an almost universal protest by property owners so assessed, demands more than the usual amount of courage found in a council. The one person who should uphold the council in its resolution to apply local benefits in payment of the cost of an improvement—the general taxpayer—is usually so bound and hemmed in by legal restrictions that he remains inarticulate in the face of even the most shameless raids upon the public treasury. By giving him the same status before the council as is accorded the benefited property owner himself, by enabling him to secure a judicial review of assessments either at the time of the authorization of an improvement or at the time of its confirmation, and by extending him an opportunity to defend a contested assessment, the law can go a long way in aiding a full assessment of benefits.

## Advance Estimates of the Cost of Improvements and Notice of Prospective Assessments

How slipshod our methods of paying for street improvements are, is evidenced by the fact that in many cities nobody has any idea as to what a street widening or extension will cost until after it has been completed. Detailed cost estimates, if not altogether lacking, are often so far off from the final awards as to instill small confidence in their accuracy.* Even conscientious estimates frequently have a way of being rendered ridiculously inadequate through excessive awards. Under such circumstances, who can seriously blame the general taxpayer for being reluctant to have the city assume a burden of unknown amount? Who can honestly criticize the individual property owner for shying at an improvement which involves the imposition of a benefit assessment of a vague and indefinite amount?

In all fairness, it would seem that both of these objections call for remedy. To ignore them, as is the case in numerous cities, only delays many desirable projects.

If local benefits are to be assessed in the payment of an improvement, the property owners to be assessed have a right to know the approximate amount of their respective assessments before, rather than after, the improvement is carried out. To keep them ignorant as to whether they are to be within the benefited area, and, if so, as to the amount of their assessment, until after the improvement is practically finished, is not playing the game fairly with them. In all honesty, they are entitled to know about what their bill is to be when their support is asked for a project. Certainly, they should not be denied this information until both they and the city are irrevocably committed to an improvement. To afford them these facts, however, predicates detailed data as to the amount of city aid, the area of the benefited district, and the proposed assessment on each parcel within the benefited area. Such data should be made available to the general taxpayer, no less than to the property owner subject to benefit assessment; without it neither taxpayer nor property owner is intelligently able to appraise the value of the improvement to him; without it, both the general taxpayer and the specially benefited property owner are really buying a pig in a poke. A voluntarily agreed-upon price, definitely fixed and known in advance, is usually an essential of every commercial transaction; there is just as much reason why it should, so far as possible, be a fundamental characteristic of every public transaction. The more general acceptance of this principle will obviate much of the present misunderstanding relative to the financing of public improvements.

Full publicity as to the probable individual assessment prior to authorization of an improvement may, moreover, be expected to act as a desirable antidote to one of the worst abuses in the whole field of benefit assessments—the confiscatory assessment.

## How Some Cities Are Preventing Confiscatory Assessments

As a means of preventing the confiscatory assessment, some cities have hit upon the expedient of limiting the amount of benefit assessment to a percentage of the assessed value of the parcel for purposes of general taxation. A rather common rule is one that prohibits the assessment upon a lot from exceeding one-half of its taxed value.

At first blush, one would think this practice eminently fair to all concerned; it guarantees satisfactory security to the assessment bonds back of the improvement; it secures a sufficient differential between the value of the plot and the amount of the individual assessment to make probable the payment of the assessment when it is due; it strengthens a city's general credit in making it unlikely that the assessment will, through default, at some future time, have to be included within the debt limit. Yet this provision has had the effect of saddling a large share of many improvements upon the general taxpayer—especially in instances where property has been grossly under-assessed.

In the outlying sections of almost any city it is not at all uncommon to find properties assessed at a mere fraction of their real value. In such cases the assessment for benefit might, under the operation of this rule, not exceed five or ten per cent of the market value of a plot. The effect of this situation has been to enlarge the amount of city aid extended to various improvements. Some cities that have been reluctant to share in the cost of improvements have attempted to find a way out of this dilemma by assessing the benefits over a very much extended area. This solution is of course subject

* For an interesting and valuable discussion of various phases of municipal finance, to which the writer wishes to acknowledge his indebtedness, see the New Jersey Tax Survey Commission Report No. 3, 1931.

to the objection that many parcels may be included within the benefited area that are in no wise benefited by the improvement. Actually, the problem is very simple to solve. Assuming that there are valid local objections to assessing property at full value for tax purposes, it is not at all necessary to take the assessed value of a parcel in applying the half-value rule; the appraised value of the parcel can readily be taken in lieu of the assessed value where the latter is materially below market value.

In their anxiety to protect the property owner against confiscatory assessments, some communities have developed a system of checks and balances, which in actual practice serve as a formidable deterrent to the undertaking of many desirable improvements. In one city, for instance, a period of at least ten years must elapse between the benefit assessments levied against a particular parcel.

This provision, apparently designed as a protection to property owners, has an effect undoubtedly quite the reverse in many cases, as its enforcement serves unduly to delay, if not entirely to prevent the inauguration of desirable improvements. A small, even trivial, benefit assessment serves under this law to prevent the collection of another assessment until after the lapse of at least ten years; this is true, irrespective of the importance or urgent need of the new improvement.

So long as a lot is not assessed for more than the benefit conferred by an improvement, the property owner should have no complaint against assessments, whether or not ten years have elapsed since the last assessment. The interests of the property owners themselves, no less than the proper development of the city, demand a correction of such a legal provision.

In another city the law limits the amount of the aggregate benefit to one-half the cost of the improvement. Such an assessment, one would think, should prove a real help to the city treasury in financing projects, were the awards for property taken for street purposes fairly arrived at; and so it would be but for the generous compensation paid by the appraisers to owners for lands taken. In instances, it is alleged, the awards in this city have been double the fair market value of the property. Where such awards are made, it is plain that the 50 per cent benefit assessment is a farce; the city, in effect, pays the entire cost of the improvement.

Other cities have attempted to solve the problem of the confiscatory assessment by placing the initiation of assessable improvements in the hands of the property owners themselves. The council in some cities, for instance, is unable to initiate an improvement where, say, 50 per cent of the cost is to be locally assessed, unless the improvement is first petitioned for by a majority of the property owners. The petition in some cases must be signed not only by a majority of the property owners fronting upon the improvement, but also by the owners of a majority of the lineal frontage. In other words, the hands of the council are practically tied in the initiation of an improvement where the major portion of its cost is to be assessed upon the property owners, unless the property owners are themselves overwhelmingly in favor of it. Such restrictions upon the council should, as a rule, be removed. To thus prevent the initiation of improvements by the council, undoubtedly retards, where it does not entirely prevent, the authorization of worthwhile improvements.

Such guarantees as property owners may need against unwarranted improvements may more advantageously be secured to them by giving them a veto power over improvements initiated by the governing body. Improvements might, for instance, be prohibited where written objections are filed by the owners of two-thirds in value of the lands proposed to be assessed for benefits.

Experience suggests that, were full publicity given to probable assessments prior to the authorization of improvements, all these statutory precautions against confiscatory assessments would be rendered practically unnecessary.

## Permanent Condemnation and Assessment Machinery

Another embarrassment frequently met with in carrying out street widenings and extensions is found in the provision that requires the creation of entirely new condemnation machinery for each proceeding. New men without special experience in appraising property are appointed to value the property condemned and to fix the amount of the awards for each improvement. Experience in various cities has shown that where awards are made thus, appraisers are inclined to be especially sympathetic to the claims of property owners for generous compensation. How many sets of appraisers would have to be appointed under such a requirement to straighten out the tangled street system in some cities!

There is also another consideration: A new board for each proceeding results in endless delays. To have street projects drag out over a long period only serves to retard development. The more expeditiously a street project can be carried out, the sooner property owners will be in a position to proceed with the development of their property.

If a permanent board of, say, three commissioners could be appointed to assess benefits and damages in all the projects undertaken, it would make for greater efficiency and dispatch in carrying out improvements. These commissioners, being appointed for a term of years and having exclusive jurisdiction over all such projects, would become more proficient as time passed, with each new project completed, and both the property owners and the city would be better satisfied.

## Annual Improvement Budget

An annual improvement budget is probably needed in most cities to focus the attention of the taxpayers upon contemplated capital expenditures. In the absence of such a grouping of projected improvements, each improvement is of course considered and voted singly. Often it is even financed singly. The financial burden of paying for the average project is seldom considered in the light of an inclusive or well-balanced financial policy. As a result, the apportionment of costs between general taxpayer and benefited property owner varies in nearly every improvement; some projects are financed entirely through public funds, others wholly from benefit assessments, and still others through every conceivable combination of the two methods.

Some owners get their improvements as gifts, or practically as gifts; other owners pay substantially the whole cost of their improvements. As a rule, however, the benefited property owner probably pays considerably less than the amount of his special benefit, while the general taxpayer, in many cases not benefiting in any special way whatever from an improvement, pays a substantial part of its cost. The amount of city aid thus voted now and then throughout the year for various improvements becomes, as it were, a mandatory appropriation to be included in next year's budget. An annual capital budget would tend toward greater official responsibility in authorizing projects; it would abet the development of a more consistent and uniform treatment of similar classes of projects; it would equalize the burdens between property owners by opening their eyes to the unfair discrimination resulting from present practices.

Certain cities have, during the past few years, bravely set out to estimate the annual expense of carrying out their plans, year by year, during the next thirty, forty, fifty years. Such calculations are most ingenious. They would, no doubt, be of considerable value if they could be depended upon. But it is feared that some of the mathematicians making these computations have allowed their enthusiasm to run away with their hard common sense. Some persons have, of course, a greater prophetic sense than others, but certainly it is nothing short of absurd that anybody should attempt to compute,

as some persons have attempted to compute, the probable tax rate per hundred dollars, fifty years hence, to the nearest fraction of a cent.

The cost of improvements which involve mere construction, it is true, can be more or less approximated some time ahead; a tunnel, a bridge, a schoolhouse, will require no more excavation, no more cement or brick, whether it is built in 1932 or in 1950. The unit prices may vary, but if they do, the probability is that the general price level may have changed in approximately the same degree, so that ratio of cost to taxable values will not have changed materially. Figures indicating the probable cost of public works to be undertaken over a long period of years may therefore be very useful in forecasting a city's future financial requirements. When it comes, however, to estimating the probable cost of cutting through a new traffic thoroughfare, widening a narrow street, acquiring a school site, a playground or a park, twenty years hence, there are so many variables to be considered that it is humanly impossible to arrive at a worthwhile result. Changes in property values due to both increased land value and the erection, in the meantime, of new buildings are of such a character that they cannot be predicted satisfactorily for a given block or a given street, even a few years hence, to say nothing of the time when our grandchildren will be the older generation.

The long-term administrative and financial program made part of the comprehensive plan should concern itself more with general methods of administration and finance—such as subdivision control, building lines, zoning, condemnation procedure, special assessments, pay-as-you-go, serial bonds, sinking-funds—than with detailed estimates of inestimable things.

## Installment Assessments

To exact payment of benefit assessments in a single installment frequently works distinct hardship on property owners. Although many improvements are accompanied with immediate increases in property values, this rule is far from universal; in many instances the benefit resulting from an improvement is gradual in development—sometimes it may be years in accruing.

To demand the whole benefit assessment in a single payment in instances where the benefit is either slow in growth or long deferred is especially unfair to owners in modest circumstances. The collection of such assessments all at one time may completely wipe out many equities. Spreading the cost of improvements to property owners over a period of years obviates this situation by adjusting the amount of the installment collected within any one year more nearly to the means of all the property owners. This method, moreover, may enable a city to conserve its credit by financing many improvements through benefit assessments of which it would itself otherwise have to assume the entire cost.

Where installment assessments are permitted, an owner usually has the option, if he chooses to exercise it, of paying off all remaining unpaid installments at any time he may elect. Unless the municipality has a call provision in its outstanding assessment bonds, it will itself have to pay out of its own pocket the amount of interest that the owner saves through a remission of the unpaid installments. The city will, moreover, be obliged to carry these cash payments in its treasury until the bonds mature three, four, eight or nine years hence. Both of these difficulties can be obviated by inserting a call provision in the assessment bonds, so that the city may enjoy the same privilege of reducing the outstanding issue of bonds as is accorded the property owner in liquidating his own indebtedness.

In the financing of special assessments, the best expert opinion seems to be that each individual project should be financed by the issuance of temporary notes from time to time as cash may be needed for that particular improvement. Such notes may be retired out of the proceeds from three different sources: the full or partial payments made by property owners; the proceeds from the sale of special assessment bonds issued on the basis of deferred installments; and the proceeds from the sale of general bonds for the city's share, if any, of the cost.

This plan of financing has an advantage over the revolving fund plan. With a single large revolving fund tied up with a large number of projects in all stages of completion, it is easy to allow large deficits to accumulate in the fund. Years may elapse before this condition is forced on the public attention. When, however, each project stands on its own feet, a crisis in any project, due to delinquencies, court orders or faulty administration, requires immediate action on the part of the governing body.

## Long-Term Administrative and Financial Program

Assessments usually constitute liens on the parcels against which they are assessed. Reasonable assessments are, as a consequence, fairly certain of payment. Excessive assessments, on the other hand, are very apt to remain uncollectible. In such cases the property is sold to satisfy the unpaid assessment. In so far as the sale price of a parcel falls short of satisfying the amount of the assessment, the difference must of course be assumed by the city itself. Obviously, the city and the general taxpayer, no less than the benefited owner himself, all have an active interest in having only reasonable assessments levied. As a method of recognizing the rights of all three parties, the following program is suggested:

1. Before embarking upon new major improvements, a city should prepare a comprehensive plan for its physical development, so that only improvements incorporated in, or in harmony with, the plan may hereafter be authorized.

2. A long-term financial and administrative program should be evolved defining the relative roles to be played by subdivision control, building lines, zoning, condemnation, special assessments, pay-as-you-go, serial bonds and long-term loans in achieving the improvements contemplated by the physical plan.

3. A full assessment should be made of all local benefits up to the cost of an improvement.

4. Any city aid extended toward the cost of an improvement should be strictly limited to the amount by which the benefit fails to equal the cost.

5. As a guarantee against the assumption of any part of the assessable cost of an improvement by the city, the general taxpayer should be extended the same rights in appealing and protesting against an under-assessment of benefit as is accorded the individual property owner in the case of an over-assessment of benefits.

6. Advance cost estimates, computed as accurately as possible, should be made of all proposed improvements.

7. Notice of probable amount of prospective assessments should be sent to all owners within benefited area, in advance of authorization of an assessable improvement.

8. Publicity as to probable individual assessments prior to authorization of improvements will obviate necessity for most of the statutory safeguards against confiscatory assessments.

9. An annual improvement budget is needed to focus attention of property owners upon contemplated capital expenditures.

10. A permanent board charged with the assessment of benefits and damages will, as a rule, be able to render more satisfactory and efficient service than numerous temporary boards established for each separate improvement.

11. Installment assessments are not only permissible, but desirable, in order to facilitate the financing of improvements at the expense of benefited owners.

12. The financing, through the issuance of temporary notes, of each individual assessment produces more satisfactory results than does a revolving fund established to care for a large numfited owners.

As time passes and experience accumulates, it becomes more and more evident that we have never taken a sufficiently broad view of municipal finance and taxation. We have been too prone to treat these subjects as if they were matters apart from the purposes they are called upon to perform. But we are at last beginning to realize that this is not at all so; paying for something and enjoying it are only different phases of the same thing. Failure to recognize this fundamental fact explains why so many cities have financed their street widenings in exactly the same manner as their schools; their parks as their hospitals; their subways as their city hall. But we are appreciating now more than ever, and as the rate of our urban growth slows up, we shall recognize still more, the distinction between a general and a special benefit in our method of financing improvements. For this reason we may confidently expect an increased use of special assessments in achieving a considerable number of projects contemplated by the city plan.

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# Cooperation Between Police and Public

"THE public no longer occupies the role of spectator in the battle of the police with the crook," stated John B. Blandford, Jr., Director of Safety, Cincinnati, Ohio, in addressing the annual convention of the International Association of City Managers, in that city.

"The sphere of police activity has constantly expanded until it touches every citizen, be he juvenile delinquent or elder statesman. A policeman may spend one hour out of eight pursuing robbers and burglars, but he will certainly devote the remaining seven hours to supervising traffic, settling neighborhood disputes, checking on license and permit requirements, locating the owner of overgrown weeds, and quieting the boisterous radio. These unpleasant and undramatic tasks are obviously not of his own choosing. They are jobs assigned to him through formal ordinances by citizens who are trying to make urban life as comfortable as possible.

"This field of regulation may be paved with good intentions, but it is easy to wander off the road into bogs of confusion, and inconsistency. Upon entering this field, the policeman must shed the manner and phrases which served him well in his contacts with the hard-boiled crook and become the super-salesman to the sensitive citizen. Sometimes it is not easy for him to make this adjustment. Sometimes he forgets his new costume. Sometimes he may think it was a mistake to put it on.

"The citizen does not always ease the way or illuminate the path. He complains of his neighbor's radio, but resents the suggestion that his weeds be cut. He criticizes the failure to enforce parking regulations and informs the officer who cites him for parking in a taxi-stand that he should be catching burglars. He rarely sees a policeman and always insists that taxes be reduced."

Mr. Blandford proceeded to discuss several aspects of the public relations of the police department. He called for greater public respect for the policeman, and decried the disparaging attitude so easily assumed. He maintained that greater public knowledge of police activities is needed, saying:

"The door to police operations should be opened wide. The policeman should not fight his battle alone without encouragement or aid from his employer-citizens. Radio has been a boon to police work in more ways than one. In Cincinnati we have not resorted to code or scrambling devices but have encouraged the citizens to listen to our story over his home radio. Apparently, this has had the hoped-for effect. The citizen has learned for the first time the volume and variety of police work. He has paused to wonder at the versatility of the police officer who at one moment persuades boys to play football on the playgrounds rather than in the street, and in the next moment risks his life in a filling station hold-up. Perhaps more important is the fact that he hears the police side of the story, wishes him success as he is sent to apprehend some prowlers and, psychologically, aligns himself on the side of the policeman. Eventually, this evolves into teamwork and cooperation."

Greater readiness in reporting crimes and suspicious circumstances to the police was urged, and regular conferences between the police and representatives of certain businesses specially dependent on or useful to the police, such as filling stations, used-car dealers, department and chain stores and real estate agents, were advocated.

Discussing the participation of the police in crime-prevention work, Mr. Blandford said:

"As a matter of fact, there are several large police departments which are doing a very acceptable job in the crime prevention field. The average policeman has a good share of common sense and sympathetic understanding. Daily and unheralded, he makes neighborhood adjustments which are constructive and which might well carry the label of social work. In the traditional safety department field, we are sensing new relationships. It is my belief that the crime prevention bureau is the logical connecting link between welfare and police, just as the fire prevention bureau is between fire and building inspection.

"I am not proposing that each policeman be a trained social worker. I am proposing that he be oriented in this field, that he know community social resources and that we utilize the thousands of daily contacts and discoveries of a large section of our city personnel. I am suggesting that the public enlarge its conception of police work and recognize the greater potentialities of police personnel."

In conclusion Mr. Blandford said:

"Beyond a doubt, tremendous strides have been made in the selection and training of police personnel. . . . I believe we should keep constantly in mind that the policeman, through his hundreds of daily contacts, has tremendous opportunity to teach citizenship and that therefore he should be prepared for that task. He has innumerable opportunities to demonstrate what a community means by citizenship. He represents the community. Public opinion speaks through his lips and acts. In short, the policeman should himself represent and be trained to represent the community's highest conception of citizenship."

# Garbage Collection Under Town Government in Brookline, Mass.

*By* ARTHUR A. O'SHEA
**Cost Accountant,**
**and**
DANIEL G. LACY
**Superintendent of Garbage Collection**

BROOKLINE, MASS., is a community with a population of approximately 47,500 inhabitants. It has an area of 6.81 square miles and is 4.37 miles long and 1.93 miles wide at the broadest point and is primarily a residential community. Because of its geographical proximity to Boston and the rapid commutation service which is available, many professional and business men who are associated with activities in Boston maintain their residences in Brookline.

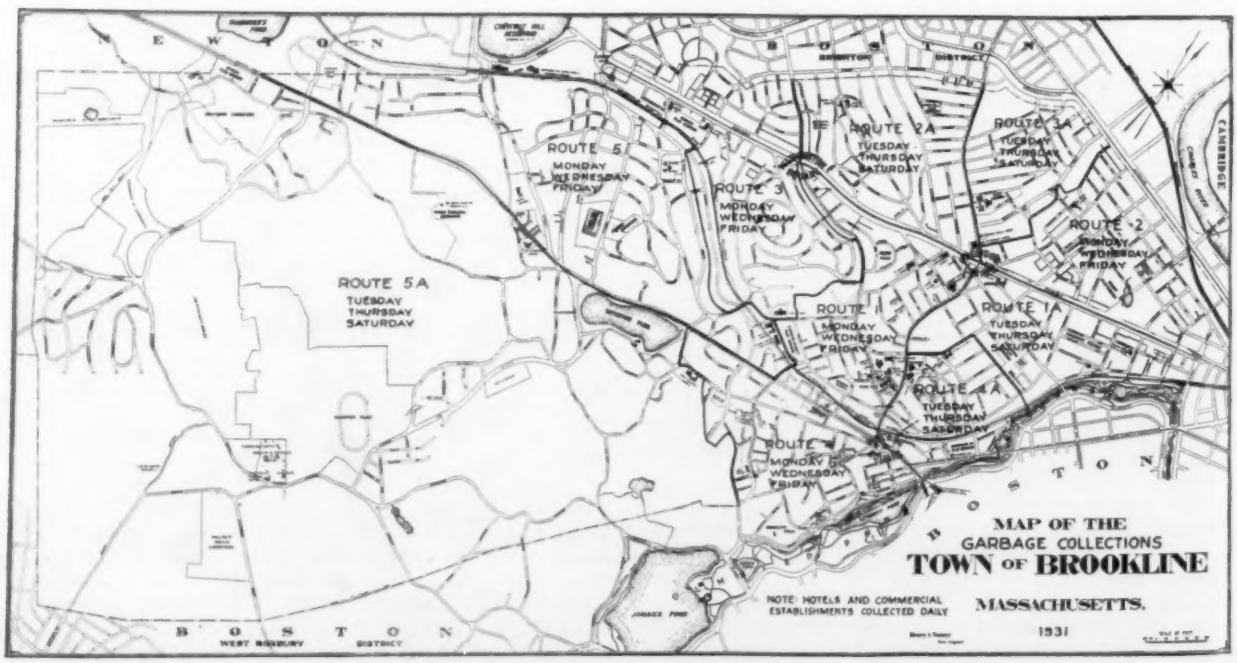
### Contract System Discarded

For a great many years the town had tolerated a contract system for the collection of garbage. The system was unsatisfactory because of heterogeneous equipment, unsanitary wagons, irregular collections, frequent complaints, and the accompanying disturbances. Disregarding, therefore, what was apparently an attractive contract from the viewpoint of dollars and cents, when the question of service was not considered, the town voted in 1921, strictly as a health measure, to undertake the task of organizing the service by municipal forces under direct municipal supervision.

### Organization for Municipal Service

In organizing the department, it was recognized that the previous arrangement of one collection a week under the contract system was inadequate and unsatisfactory. It was therefore decided to collect garbage three times a week from residences, and daily from commercial establishments because of the quantity produced; in other words, standard of service rather than cost was the determining factor, yet, strange as it may seem, the high standard involved a comparatively low cost to the citizens. An important advantage of frequent collections is the fact that the garbage does not reach the stage of decomposition that is experienced in many other communities. Obviously, the collection trucks often pass unnoticed, at least as far as offensive odors are concerned, and as a result there is a distinct absence of complaints with respect to this usual collection nuisance. To further prevent any possible objection as to smell or unsightly appearance, tarpaulins are used to cover the loads as they are being accumulated.

The town is laid out into definite routes, as shown on the map, and the adherence to time schedules is really extraordinary. Even snowstorms no longer present difficul-




MAP OF THE TOWN OF BROOKLINE, MASS., SHOWING THE COLLECTION DISTRICTS OR ROUTES

lies of interruption to service, for during the past six years no time has been lost in collection work. A set of regulations which are used in conjunction with the ash and paper collection service are reproduced with this article. For convenience in this text, those regulations referring to garbage collection are printed in bolder type.

An attempt is made to prevent any lost effort in the time of collection. For example, if a family leaves for an indefinite trip or goes away on a summer vacation, the collector after two or three calls drops the premises from his route. The burden is then on the householder to call the garbage collection headquarters, and collections are immediately resumed.

The tonnage collected is somewhat less in summer than in winter owing to the migration of families to summer resorts. Although the tonnage is less, the bulk due to green vegetables, corn and the like is somewhat increased. Nevertheless, the change permits the Department to give each employee a vacation of two weeks without upsetting the force by the influx of too many "green men." In addition to this vacation, the employees receive two weeks' "sick leave" when their absence is justified by a doctor's certificate. They are also paid for eleven legal holidays and are given a half-holiday on Saturday the entire year. The collectors receive $5.00 and the chauffeurs $5.50 for an 8-hour day.

## Collection Equipment

The Department operates five 5-ton trucks with 6-yard bodies and one 2½-ton truck with a 4-yard body in the collection service. The trucks are municipally owned and maintained. They are overhauled and painted each year, and washed with warm water every night, and present a neat appearance while on duty. This high standard has a distinct esthetic value to the citizens and their community, and the absence of heterogeneous equipment no doubt makes the trucks less noticeable in moving about on the streets.

The truck bodies are constructed to meet the standard Brookline specifications. Brookline was the first community to employ other than the ordinary fish-tail dump body. The body used is similar to the standard dump type equipped with a power hoist, but a watertight tail-gate is effected by the use of rubber tubing. Pneumatic tires are used, for they increase the speed and cut down that part of maintenance cost which is due to the tremendous pounding and jarring resulting from the use of solid tires.

### Town of Brookline
#### Board of Health

NOTICE OF THE BOARD OF HEALTH

Attention is respectfully called to the following regulations of the Board of Health:

ARTICLE III

WASTE MATERIAL – GARBAGE

*Sect. 1.* All waste material set out for removal by the town shall be kept in separate receptacles.

**Sect. 2. (a) One or more of such receptacles shall be used exclusively for garbage or swill, shall be water tight, have tight fitting covers, and be kept clean and free from deposits of garbage.** (An underground garbage receptacle is urgently recommended.)

**(b) That on and after May 15, 1923, a charge of twelve and one-half cents ($0.12½) per barrel shall be made for the collection of garbage from all commercial establishments of the town where the quantity exceeds one-half barrel (regular size) on each collection day.**

(c) That on and after December 1, 1923, a charge of twelve and one-half cents ($0.12½) per barrel shall be paid for the collection of waste, ashes, and combustible material from all commercial establishments of the town where the quantity exceeds one barrel (regulation size) on each collection day.

*Sect. 3.* A second receptacle or receptacles, preferably made of iron, shall be used exclusively for ashes, tin cans, bottles, and other incombustible waste.

*Sect. 4.* A third separate set of receptacles shall be used exclusively for dry combustible waste, such as paper, old shoes, house sweepings, and such other waste material as it is customary for the town to remove.

*Sect. 5.* No person shall overhaul the contents of receptacles of waste material set upon the sidewalks to be removed by the town.

*Sect. 6.* No person shall throw upon the sidewalks or into any public street or catch-basin, any paper, tin can, house sweepings, lawn rakings, old shoes, orange peel, banana skin, dead animal or other waste material.

Bottles or cans must not be placed in the receptacle for paper and other combustible waste.

All broken glass, crockery, floor sweepings, cans, bottles and other incombustible materials should be placed in the receptacle for ashes.

All papers, rags, excelsior, straw, mattresses, old clothes, old shoes, rubbers, paste-board boxes, leather, old carpets and combustible waste generally should be placed in the receptacle for combustible refuse.

The use of receptacles for ashes larger than an ordinary flour barrel is strictly prohibited.

Earth, gravel, bricks, mortar, stones, lime, plaster, cement, concrete, refuse material from repairs or construction of buildings, refuse material from manufacturing establishments, or ashes other than those accumulated from the burning of coal for heating or domestic purposes will not be removed by the Health Department wagons.

**Persons using iron receptacles above ground for garbage in cold weather do so at their own risk, as it is practically impossible to remove frozen garbage from an iron receptacle without damaging the receptacle.**

Every receptacle must be removed from the sidewalk immediately after collection of contents.

*(Extract from Town By-Laws)*

ARTICLE XVIII

*Section 15.* No person shall place or cause to be placed any barrel or other obstruction upon any public way or sidewalk and allow it to remain more than one hour after being notified by a police officer to remove it. *(Penalty, $50.00.)*

By Order of the Board of Health,

AGNES G. KILLION,
*Secretary.*

Brookline, Mass., Sept. 19, 1927.

REGULATIONS FOR COLLECTIONS OF GARBAGE ASHES AND RUBBISH

Pneumatic tires also reduce the wear and tear on town-maintained roadways. The average loading height of the trucks in the present service is 6 feet 3 inches. Wherever possible, the men use the sidewalk curbing in the attempt to reduce this loading height by approximately 8 inches. There are now appearing on the market several new underslung chassis types of garbage collection equipment which will revolutionize the entire service. In these new types there are to be found self-trimming features as well as mechanical loading devices and, in many instances, loading heights that do not exceed 56 inches.

THE FLEET OF MACK TRUCKS USED IN THE COLLECTION SERVICE

### The Collection Crews

Each truck is in the direct charge of a chauffeur who is responsible for a schedule and takes all orders with respect to the collection from the inspector. To each truck are also regularly assigned three collectors, supplemented on Mondays and Fridays by an extra collector, owing to a proportionately heavier tonnage on these days. Each chauffeur must also act as a collector, and conversely each collector is called upon in various instances to drive the truck. When the truck starts off on a route, each collector goes to the householder's place of garbage storage, usually in the rear of the premises, and whenever it is necessary, as in case the chauffeur happens to be engaged in the work of collection, the collector boards the truck and drives it ahead so that as fast as garbage is collected, the truck is being brought ahead by each man in turn.

When the first load is completed, the chauffeur drives the truck to a private hog farm in Lincoln, Mass., which is approximately 24 miles round trip. In the event that a second load is to be collected on a heavy day, while the chauffeur is driving to the farm collectors go to lunch. By the time the truck returns from the farm, the men have finished eating and the chauffeur then goes to lunch, the truck being started off again on the route by one of the collectors. The inspector then picks up the chauffeur and returns him to the truck at his location on the route.

The approximate tonnage that should be collected by each force has been determined, and there is an understanding that when the tonnage is collected, the day's work has been accomplished and the men are through; consequently, there is a tendency to keep moving and each collector is in reality a check upon his co-workers, for the slow man is not tolerated in view of the fact that he is preventing the other men from finishing early. The collectors average about thirty years of age and are physically strong and agile. The men are therefore working at top speed in the morning when their resistance is highest, and in the early part of the afternoon when fatigue is naturally inclined to manifest itself they are finishing up. This has the added advantage of keeping the trucks on the street for a minimum period.

### Uniforms, Revenue and Complaints

The town furnishes uniforms, and the men are therefore able to protect their clothing and at the same time present a creditable appearance. The collectors use a 10-gallon galvanized pail.

COLLECTORS AT WORK ON A ROUTE

Brookline Garbage Dept.

**COMPLAINT**

No. Date

Name

Location

Nature

**REPORT**

Interviewed

Facts

Collector at Fault

Complaint Justified?

*Inspector*

THE COMPLAINT REPORT BLANK

Not as a source of revenue primarily, but rather as an equitable arrangement, all commercial establishments are charged 12½ cents per barrel for all barrels in excess of one. Tickets are procured at the headquarters in the City Hall. They are serially numbered and are not transferable, and to prevent any possibility of dishonesty, a constant check is kept on all establishments with respect to the number of tickets purchased and collected.

An analysis of the comparatively few complaints indicates that many of them are not justified. Many are due to the inadequacy of household containers in comparison with the number in the family, social functions creating an abnormal supply, and frozen receptacles that prevent removal of garbage without serious damage to the container. The inspector, however, is obliged to report on every complaint. A copy of the complaint form is reproduced above. The inspector must see some responsible party at the premises and obtain all the facts, and if the fault is with a new home owner, the inspector is required to explain the town regulations.

### Disposal

The garbage is delivered under the terms of the contract to the hog farm at Lincoln, where each load is weighed and recorded. For this material delivered at the farm, the town has been receiving a payment of $12,000 a year. This lucrative arrangement, together with the amount received from tickets sold to commercial establishments, greatly reduces the cost of the service.

COST STATISTICS

| | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 |
|---|---|---|---|---|---|---|---|---|---|---|
| Gross cost per ton | $5.87 | $5.94 | $5.84 | $5.69 | $5.57 | $5.94 | $6.46 | $5.46 | $5.11 | $5.42 |
| Net cost per ton | 3.81 | 4.48 | 4.79 | 5.75 | 5.10 | 5.61 | 4.71 | 3.95 | 4.60 | 4.36 |
| Population | 41,326 | 42,500 | 42,681 | 44,500 | 45,000 | 46,000 | 47,103 | 47 437 | 48,000 | 48,000 |
| Net cost per capita | $ .66 | $ .75 | $ .87 | $ .96 | $ .93 | $ .88 | $ .75 | $ .72 | $ .84 | $ .79 |
| Pounds of garbage per capita | 331 | 337 | 349 | 339 | 361 | 351 | 320 | 366 | 362 | 365 |

# FORWARD STEPS

**Reported by**
**Municipal Officials, Chamber of Commerce Executives, and Others**

## *A City Hall and Courthouse of Modern Design*

ST. PAUL, MINN.—The formal dedication of St. Paul's new $4,000,000 City Hall and Courthouse took place December 19 and 20. The building is part of the $15,000,000 five-year plan of public improvement, adopted by the voters in the 1928 election. During this time many new private buildings have been added to the public improvements made.

The St. Paul City Hall and Courthouse is modern in design. Thomas Ellerbe and Co., of St. Paul, and Holabird and Root, of Chicago, were associate architects. In order to minimize street noises in the many court rooms in the building, a tower type was determined upon. From the four-story base of the building rises a seventeen-story tower. The deep windows with white Nirusta (metal) trim are flush with the exterior, a departure in office building construction. This permits the use of double sash effects in the court rooms, making them soundproof. To give depth, Nirusta fins extending from the building have been placed at the windows. The building is of steel and concrete construction and faced with Indiana limestone. The exterior is floodlighted in color (see Outdoor Lighting section, page 102).

Architectural sculpture by Lee Lawrie above the entrances of the first three floors supplies the only exterior ornamentation. The interior furnishings and decorations are carried out in the spirit of contemporary design. John Norton has done four historical murals which are placed to great advantage in the Council Chamber, paneled and furnished in English pollard oak. Twenty-five rare woods are used in paneling offices and court rooms, and sixteen beautifully marked marbles from all parts of the world are in corridors and elevator foyers and as wainscoting. The use of wood and marble in interior furnishings insures durability and the minimum of upkeep necessary in a public building. The elevator design work was done by E. R. Stewart.

The climax of a building which is already considered one of the most interesting and significant public edifices in the United States is the symbolic statue by Carl Milles, Swedish sculptor, which is placed in the grand concourse of the building. This great hall is 100 feet long and has forty-foot pillars in gleaming *bleu belge*, an almost black imported marble. These pillars are buttressed in bronze and throw columns of light against a gold-mirrored ceiling. In a marble niche, enhanced by strategic lighting effects, stands the statue by Milles, executed in translucent glass. This great symbolic statue, the first of its kind, is expected to bring art lovers from all over the world. Dedicated to the war heroes of St. Paul and Ramsey County, the statue represents Indians seated about their council fire. From the smoke of their fire and their peace pipes rises the great figure of the Indian God of Peace.

The St. Paul City Hall and Courthouse is interesting because of the economy of planning which has made 80 per cent of its floor space available for use, and because of insistence upon the best in materials and workmanship. It is confidently expected to grow in use and beauty through many years.

KATHARINE B. SPEAR,
St. Paul Association of Commerce.

CITY HALL AND COURTHOUSE, ST. PAUL, MINN.
The lower view shows the Probate Courtroom, which is paneled in Honduras mahogany with American walnut furnishing

## *How Red Wing Was Given 232 Acres of Parks*

RED WING, MINN.—Parks covering 232 acres, or about one-fifth of the total built-up area of this city of 9,629, have been acquired by Red Wing in the last 26 years, and 95 per cent of the area came into the city's hands without cost to the taxpayers.

The Civic Center contains two parks, one of which, formerly a sandpit, was developed by a gift of $10,000 from a citizen. Around the Civic Center are grouped the Municipal Auditorium, the Carnegie-Lawther Library, the Court House, the central High School, the Post Office, the Masonic Temple, a railroad station, the Y. M. C. A., and seven churches. Pierce Park, on the Mississippi River at right angles to the Civic Center, is "made" land which was formerly the city dump. It is three-fourths of a mile long and a block wide and is attractively improved with trees and winding walks.

MT. LA GRANGE, IN ONE OF THE FIVE PARKS OF RED WING, MINN.
The 472-step stairway, rising 310 feet to the summit, appears in the foreground

Mt. La Grange, near the lower end of Pierce Park, rises 335 feet straight up from the river. Its area of 50 acres has long been a city park, donated by a group of leading citizens. In 1929 the Red Wing Kiwanis Club built a stairway of 472 steps to the top of the towering bluff. It was financed by the sale of steps on which were engraved the names of the donors.

Colvill Park was given to the city for use as a bathing beach by a group of women who rose up in arms because of numerous drownings among children swimming at unprotected places in the river. When pollution later made the river unfit for swimming, a $45,000 pool was installed, paid for chiefly from the profits of the municipal theater.

The latest acquisition, Soldiers' Memorial Park, on Sorin's Bluff, is the largest of Red Wing's parks. Its purchase in 1929 was made possible by the proceeds of home-talent plays and a gift of $10,000 from a retired capitalist of the city. An automobile road has been built through the grounds, a handsome memorial gateway erected, and picnic equipment installed. The park is visited by hundreds of tourists and visitors every Sunday and by scores on week-days.

In the winter of 1931-32, $5,000 was raised in Red Wing to provide work for the unemployed. The project chosen was the landscaping of an old stone quarry in Memorial Park. The former quarry is now a handsome rock garden, with parking places where visitors may sit in their cars and view the landscape for miles up and down the Mississippi valley. If more unemployment relief is needed this winter, the park may be further improved. Though it cost the city nothing, this park is now carried on the city books at a valuation of $15,000.

Red Wing is proud of the fact that 95 per cent of all its magnificent park area was acquired and developed without a cent of cost to the taxpayers, through the generosity of public-spirited citizens, small donors as well as large.

G. R. A.

## *The Financial Reorganization of Johnstown*

JOHNSTOWN, PA.—This city has been shown the way to avoid the pitfalls that have been engulfing many American cities.

As the result of a four-month survey by consulting engineer Ernest P. Goodrich, of New York, Johnstown has been told how to put its financial house in order, how to reduce its costs in keeping with declining revenues, and how to obtain the greatest efficiency in return for the money expended.

Starting work July 1, the consultant and his staff made exhaustive studies in every branch of the city government and submitted reports on their findings from time to time to the City Council. In his final report Mr. Goodrich estimated that, if all his recommendations were put into effect, municipal expenditures could be reduced nearly $400,000 in 1933.

One of the most interesting developments of the survey came in the form of a proposal that salaries and wages be adjusted each year on the basis of cost of living studies. Suggesting the use of statistics compiled annually by the U. S. Department of Labor in making the adjustments, the engineer suggested payroll reductions to meet the present low cost of living and then upward scaling at intervals to allow for increasing costs.

In efforts to straighten out the city's financial affairs the consultant advocated a $360,000 refunding bond issue, which probably will be floated next year, to spread the burden of heavy debt maturities over a period of years. Modern business machines were installed at his suggestion to handle accounting and statistical work, and a central purchasing department was set up with a view to reducing costs through quantity buying.

Reorganization of the Police Department, which has been the battleground of Mayor Eddie McCloskey, under a civilian superintendent of police, was proposed and approved by Council. The reorganization plans, calling for a cut of 20 in personnel and about $20,000 a year in budget, also provided for motorization of police patrol and establishment of a juvenile police force to aid in controlling a "bad boy" problem.

Although the Fire Department escaped drastic changes, a new system for handling fire alarms was developed to give the city the equivalent of full box alarm protection at practically no added expense. Recommendations relative to the Fire Department were approved by the underwriters, with assurances of adjustment in fire insurance rates when all of them were put into effect. Council ruled that several items of new equipment could not be purchased at the present time, delaying the major results.

A drill school for firemen was established under guidance of the engineer, and another for police planned.

Opposition was raised to plans for reorganizing the Health Department under a full-time, trained health officer, but the medical profession rallied solidly behind the project, which is still awaiting final action. Much of the opposition was traceable, as in at least one other instance, to efforts to "save jobs" for employees whose work was under fire.

Street and public improvement work was put on a mechanized basis with a resultant reduction in payroll costs. Park development came in for constructive suggestions, as did recreational work.

In all departments the expert drew up organization charts and sought to clarify the duties of employees. There was a marked effort to relieve employees of detail work and make their time available for more useful tasks.

The reports and recommendations compiled in the survey ran into hundreds of pages. While many of them were filed away without formal action by Council, there are indications that most of them eventually will be adopted in some form or gradually incorporated into the changes being made within the respective departments.

RAMON COOPER.

## *High Towers Aid New Survey*

DETROIT, MICH.—The City Engineer's Office of the Department of Public Works of this city has begun a triangulation survey of the city, based on the work of the U. S. Coast and Geodetic Survey.

This arc of triangulation was run in from the west and ties to a former line established by the U. S. Lake Survey and definitely decides the geographic position of stations in the Detroit area.

The U. S. Coast and Geodetic Survey party, consisting of about 30 men, encamped at the State Fair Grounds. They erected steel towers over 100 feet high in several parts of the city, affording the means of overcoming obstructions between stations. Twelve such towers are carried as part of the regular equipment of the party. Working at night and sighting on electric lamps, the angles were read to a single second of arc with a high-powered direction theodolite. Observing towers were placed at the following locations: River Rouge Park, Twelve Mile Road near Van Dyke Avenue, Mt. Clemens, Walpole Island two others in Canada. Stations not requiring towers were established on the Penobscot, General Motors and New Whittier Buildings. These latter three form a triangle upon which all the city work will be based. In addition, numerous "natural objects" were observed. These consist of tanks, stacks, church spires, etc., and are called intersection stations.

In the city work, the lines being much shorter, the observing is done during the day. The city is interlaced with a network of traverses, which were started in 1917. They were based on a former U. S. Lake Survey line and have as their origin a stone monument in a hand-hole in the pavement at Woodward and Michigan Avenues. This point is the center of Campus Martius and is the junction of the lines of the Governor and Judges' plan of the city. These traverses afforded diminishing accuracy as they receded from the base, and the purpose of the new survey is to discover the amount and location of the errors in them. For the most part, high buildings are being used for stations and only in a few instances will towers be necessary. The work requires two field parties and will require about two years to complete, at which time the city will be mapped with the highest possible accuracy. A system of precise bench marks has just been completed, based on the 1929 adjustment of the U. S. C. & G. S. It comprises 2,500 points throughout the city; it, with the triangulation survey, places Detroit in the class of well-surveyed cities.

JOSEPH S. STRINGHAM,
City Engineer.

## *County Adopts Efficient Work-Relief Plan*

MILWAUKEE, WIS.—Milwaukee County has inaugurated a work-relief plan that has the important feature of continuous employment instead of alternating shifts of ten days or so. The tentative work schedule is set at four to six hours a day for a five-day week, the total number of hours depending on the size of the worker's family, which it is hoped will be made self-sustaining. The plan will remove men from dependence on public charity and put them to work on useful public construction, repair and maintenance projects. Ultimately more than 10,000 men on county relief may come under the new program. Public work for municipalities is included in the activities undertaken, the municipalities in the county furnishing tools and materials, and the county paying for the labor out of relief funds.

The continuous-work feature of the plan eliminates the breaking-in of recruits when the shifts change, and does away with much lost motion. The assurance of steady contact with even a limited work program is expected to have the psychological result of stimulating effective effort and improved morale.

The argument that it is a physical impossibility to get efficient work from these workers, who represent practically all types and conditions of common, semi-skilled and skilled labor, is weakened considerably if a study be made of the normal development of similar undertakings during more normal times of employment. A single firm of architects and engineers during the past ten years supervised labor crews of the following diverse character, on golf courses, parks, play-fields and other landscape developments: there were lumberjacks, fishermen and sailors from the Great Lakes region; automobile factory workers from Michigan; bricklayers, shoe-factory employees, ship-yard mechanics, taxi-drivers, structural-steel workers, plumbers and carpenters from the industrial centers, and farmers and road builders from nearby localities; all taking advantage of slack time in their regular trades to get work on this periodic construction that came to their neighborhood where it must find its own labor.

There are many instances where engineers and construction supervisors have literally had to "break in" whole crews to such work—sometimes entirely made up of laborers unable to speak English. The average worker for the unemployment relief job is perhaps no more inexperienced than most common laborers who are forced to tackle a new line of work.

FRANCIS J. KELLEHER.

# A Fire Department's Educational Display

*Photograph by courtesy of The Gamewell Co.*

EXHIBIT OF THE JACKSON FIRE DEPARTMENT AT THE MISSISSIPPI STATE FAIR, OCTOBER, 1932
Prepared under the direction of Fire Chief L. F. McDonald

# TRAFFIC CONTROL AND FACILITATION

**Conducted by Publications Committee, Institute of Traffic Engineers, 175 Fifth Ave., New York**

Maxwell Halsey, Chairman, Hawley S. Simpson, Harry H. Hemmings, Arthur G. Straetz, I. S. Shattuck, P. J. Stupka, Donald M. McNeil

## *A Check-up on Traffic-Law Violations in Washington, D. C.*

A VERY interesting paper on a "Study of Traffic-Law Violations" was given by W. A. VanDuzer, Director of Traffic, Washington, D. C., at the recent meeting of the Highway Research Board.

A real check of the observance of traffic laws was made in Washington in order to establish the effectiveness of such laws. Since it is most important to know which regulations of traffic have a sound basis, the traffic department of Washington has made a series of checks this past summer.

Two men—one observer and one recorder—are placed at the intersection, and the data are recorded on blanks which cover ten of the most important regulations. For checking speed the Eno Foundation Speed Detector was used. The intersections selected were covered by automatic signals, stop signs, and some intersections were uncontrolled. Speed was checked in the middle of the block.

The violations vary according to the control devices. At an intersection covered by automatic signals the violations amount to about 15 per cent of the number of cars passing the intersection. Failing to yield the right of way to either a vehicle or to a pedestrian caused the largest number of violations (Table 1).

TABLE 1

RECORD OF VIOLATORS OF TRAFFIC REGULATIONS AT INTERSECTIONS CONTROLLED BY TRAFFIC LIGHTS, 6-HOUR COUNT, SEPTEMBER 2, 1932, WASHINGTON, D. C.

| Violations | Totals No. | Totals % |
|---|---|---|
| Exceeding speed limit | 200 | 1 66 |
| Failing to yield right of way (to vehicles) | 349 | 2 90 |
| Failing to yield right of way (to pedestrains) | 531 | 4 42 |
| Cutting corner | 211 | 1 74 |
| Turning from wrong lane | 42 | 0 35 |
| Driving on left of center line | 47 | 0 38 |
| Entering on amber-green leave on red | 309 | 2 56 |
| Entering on red signal | 170 | 1 41 |
| Total violators | 1,859 | 15 42 |
| Driving lawfully | 10,196 | 84 58 |
| Total through intersection | 12,055 | 100 00 |

At uncontrolled intersections 30 per cent of the automobiles were driven in violation of some regulation (Table 2).

TABLE 2

RECORD OF VIOLATORS OF TRAFFIC REGULATIONS AT UNCONTROLLED INTERSECTIONS, 5¼-HOUR COUNT, WASHINGTON, D. C.

| Violations | Totals No. | Totals % |
|---|---|---|
| Exceeding speed limit | 701 | 11 7 |
| Failing to yield right of way (to vehicles) | 431 | 7 2 |
| Failing to yield right of way (to pedestrians) | 341 | 5 7 |
| Cutting corner | 155 | 2 6 |
| Turning from wrong lane | 32 | 0 5 |
| Driving left of center line | 43 | 0 7 |
| Passing car in intersection | 89 | 1 5 |
| Total violators | 1,792 | 29 9 |
| Driving lawfully | 4,197 | 70 1 |
| Total through intersection | 5,989 | 100 0 |

At an intersection controlled by stop signs the failure to stop against the through street offers the largest number of violations. These amounted to almost half of the cars passing through the intersection (Table 3).

TABLE 3

RECORD OF VIOLATORS OF TRAFFIC REGULATIONS AT INTERSECTIONS WITH STOP SIGNS ON ONE STREET, 3½-HOUR COUNT, WASHINGTON, D. C.

| Violations | Totals No. | Totals % |
|---|---|---|
| Exceeding speed limit | 814 | 21 6 |
| Failing to yield right of way (to vehicles) | 65 | 1 7 |
| Failing to yield right of way (to pedestrians) | 131 | 3 5 |
| Cutting corner | 68 | 1 8 |
| Driving through safety zone | 7 | 0 2 |
| Turning from wrong lane | 8 | 0 2 |
| Driving left of center line | 51 | 1 3 |
| Passing car in intersection | 34 | 0 9 |
| Partial stop under control at Stop signs | 373 | 9 9 |
| Not stopping at Stop signs | 285 | 7 6 |
| Total violators | 1,836 | 48 7 |
| Driving lawfully | 1,931 | 51 3 |
| Total through intersection | 3,767 | 100 0 |
| Complete stop at Stop signs | 526 | 44 5 |
| Partial stop under control | 373 | 31 5 |
| Not stopping at Stop signs | 285 | 24 0 |
| Total violators | 658 | 55 5 |
| Total driving lawfully | 526 | 44 5 |

Through this and similar studies it is hoped to reduce accidents that have resulted in approximately 80 deaths and 3,000 injuries per year.

## *Los Angeles Counts Downtown Pedestrians*

MANY American cities have spent considerable time and effort in obtaining facts with regard to the vehicular traffic flow on city streets, but comparatively little has been done to determine pedestrian flows in heavily congested districts.

Using funds for the relief of unemployment, the traffic engineering department of Los Angeles, Calif., recently completed a sidewalk count of pedestrians in the heart of the retail shopping district. The area involved is five 600-foot blocks long and four 360-foot blocks wide.

While most of the facts brought out are of local value only, data of interest to other large municipalities were obtained.

More than two million pedestrians were counted within the area, the count being taken midblock, on each sidewalk. A pedestrian walking six blocks was therefore counted six times.

The four largest department stores within the district are on the west side of Broadway, from Fourth to Eighth. The sidewalks serving these department stores were far more congested than any others, the counts for the four blocks running from 70,000 to 80,000 in each case between 7 a.m. and 11 p.m. Where there were no large department stores within a block the highest count was 41,620.

The heaviest concentration noted was a little more than 3,000 in a 15-minute period, or an average of 200 a minute. This sidewalk is 17 feet wide.

Although there was considerable variance between blocks, the entire district showed 17 per cent more persons walked on the shady side of the street than on the sunny side.

Slightly more than 50,000 pedestrians were counted on the sidewalks around the four sides of Pershing Square. On the opposite sidewalks from the square, where stores are located, more than 78,000 pedestrians were counted.

The heaviest intersection, Seventh and Broadway, showed 185,000 pedestrians in 16 hours, exclusive of street-car transfers.

An hourly graph of the flow would show a very light flow between 7 and 8 a.m., a heavy increase between 8 and 9 a.m., rising to a peak between 12 and 1 p.m., and dropping off suddenly after 6 p.m. From 6 to 9 p.m., the number of pedestrians remains approximately constant, dropping off to almost nothing at 11 p.m.

One of those interesting (but useless) "if placed end to end" comparisons may be made. As each pedestrian had to walk a block to get counted, and the total number counted exceeded two million, it could be stated that the amount of walking done in one day within this district would be equal to the distance between the earth and the moon.

## *Traffic-Light Placement and Traffic-Control Cost Studied in Pittsburgh*

TWO studies now under way in the Bureau of Traffic Planning of Pittsburgh, Pa., are expected to result in a "formula" for the placing of new traffic lights.

Since it is realized that a traffic light, wrongly placed, may impede traffic and encourage law violations, the studies are thought particularly important in view of the numerous requests for new equipment at nearly every intersection in the city carrying an appreciable traffic burden.

One study concerns the relative effectiveness of "P.X." pedestrian signals as compared to fixed-time-cycle traffic signals, and a determination of conditions under which each should be used.

A similar comparison is being made of flashing "Stop" signals, and fixed-cycle "Stop-and-Go" signals. This study also includes a determination whether the stop should be in two directions at an intersection or in all four ways.

While traffic engineers have long known the "formula" or traffic burden justifying the installation of an ordinary "Stop-and-Go" light, the effective use of the newer types of equipment has not yet been the subject of an engineering study leading to the development of an empirical formula for their proper installation.

Six pedestrian-actuated traffic lights have been under observation in Pitts-

burgh for the past year, their operation being compared with "Stop-and-Go" lights of the ordinary fixed-cycle type at comparable intersections. The intersections were watched for observance of the lights by pedestrians, the protection given to pedestrians and vehicles, the effect on traffic flow, and the character of accidents.

The results of the two investigations are to be prepared in report form, available for general publication in the early part of 1933.

An analysis of traffic-control costs in Pittsburgh by the Bureau shows that from a dollar and cents standpoint, a combined officer and signal control of a congested business district in a large city is over twice as cheap as officer control alone. The investigation, covering the cost of handling traffic in 1927, before the downtown flexible progressive signal system was installed, and in 1932, shows a cost reduction per intersection of 57 per cent, or a saving of $1,970 per intersection, based on the same wage scale as in 1927.

Aside from this distinct economic benefit, measurable in dollars and cents, the system has produced other direct benefits, difficult to appraise, but nevertheless valuable. As compared to 1927, traffic in downtown Pittsburgh has increased 37 per cent, and its speed of movement by 21.5 per cent. Instead of being controlled for 8 hours per day, it is controlled for 17 hours per day. In other words, the engineering attack on traffic handling has resulted in an accommodation of increased burdens of traffic, traveling at greater speeds, and accomplished at a saving in cost over the old method of handling traffic by officer control alone.

The following "pertinent facts" about traffic control in Pittsburgh, prepared by the Bureau of Traffic Planning, detail the cost items in this municipal activity:

PERTINENT FACTS ABOUT TRAFFIC CONTROL IN PITTSBURGH

| | |
|---|---|
| In 1924, the year before the Bureau of Traffic Planning and the Better Traffic Committee were formed, the 307 officers assigned to traffic duty, at an average salary of $2,000 per year, cost.... | $614,000 |
| In 1932, there were 225 officers assigned to similar duties (not including 39 officers assigned to school duties not covered in 1924). On the 1924 salary scale these officers would have cost.... | $452,000 |
| In spite of a *traffic volume increase of* 61 *per cent*, this decrease in cost of officer control is *sufficient to cover the entire* 1932 *operating expense of the Bureau of Traffic Planning*. It is.... | $162,000 |
| The Better Traffic Committee in its 1927 Survey Report, stated that at least 40 traffic officers could be relieved from duty in the downtown district if its recommendations were followed. To date, 54 officers have been transferred from downtown to other duties. *The reduction in cost for traffic officers downtown is* ..... | $131,220 |
| Officer traffic control downtown covering 65 intersections 8 hours per day (not including Sundays) *cost per intersection per year in* 1927..... | $4,540 |
| Combined signal and officer control covering 78 intersections, 17 hours per day, 365 days per year (including Sundays), including a proper share of the operating expense of the Bureau of Traffic Planning, *cost per intersection per year in* 1932..... | $3,000 |
| If the increase in the salaries of traffic officers is not included, *the reduction in cost per intersection is*..... | $1,970 |
| The *traffic volume* entering the downtown area has *increased* 37 *per cent; the speed* with which it is moving has *increased* 21.5 *per cent; the cost* of traffic control per intersection has *decreased* 26 *per cent* or, ignoring salary increases for traffic officers, *the cost of traffic control in the downtown area per intersection per year from* 1927 *to* 1932 *has decreased*..... | 57% |
| For traffic entering the downtown area during an 18-hour day, *traffic control in* 1927 *cost per vehicle per year for* 8-*hour service* ..... | $3.37 |
| For traffic entering the downtown area during an 18-hour day, *traffic control in* 1932 *cost per vehicle per year for* 17-*hour service* ..... | $2.00 |
| For traffic entering the downtown area during an 18-hour day, *the cost of traffic control per vehicle per year from* 1927 *to* 1932 *has decreased* ..... | 41% |

## *New Members of the Institute*

AT a meeting of the Board of Direction of the Institute of Traffic Engineers, held in Washington, D. C., December 1, 1932, the following were elected to membership:

*Member*

Wilfrid F. Irvin, Traffic Study Engineer, Toronto Transportation Commission, Toronto, Ont.

*Associate Members*

A. J. Naquin, Transportation Engineer, New Orleans Public Service, Inc., New Orleans, La.

Lawrence S. Tuttle, Assistant Highway Economist, U. S. Bureau of Public Roads, Washington, D. C.

## *British Motor Traffic Continues Expansion*

MANY interesting and valuable facts about road traffic are disclosed by The Automobile Association's annual census, which is taken at over 100 points on the principal roads in Great Britain, during a week of 77 hours each August.

Compared with last year, cars show an increase of 100,000, motorcycles a slight decrease, and public-service vehicles, trucks, etc., an increase of 26,000.

Over a period of four years from 1928, the number of cars has increased on the roads by 24 per cent, motorcycles have decreased by 18 per cent, all other classes of motors having increased by 46 per cent. In 1928 the motor vehicles recorded totalled 2,275,136, in 1932, 2,769,302, an increase of 494,166 or 21 per cent.

There is an appreciable slowing down in the growth of car traffic, unquestionably the result of the present burden of taxation. The expansion in 1932 was 5 per cent over the previous year, while in 1929 the figure was 12 per cent over the previous year. Motorcycles have been decreasing since 1929. Heavy motors made a phenomenally large increase in 1930, but only a small increase in 1931, which was a black year generally for motor transport.

The A.A. census is taken in twelve different areas, and thus it is possible to compare the relative changes. In the Home Counties the expansion in motorcars has been relatively small (11 per cent) between 1928 and 1932. In South Wales there was a decrease of 13 per cent, while North Wales had an increase of 30 per cent. In Scotland cars increased by 36 per cent in the four years.

Heavy-motor traffic in the Home Counties has grown by 37 per cent between 1928 and 1932, and in the eastern area by 106 per cent. The smallest increase was 5 per cent in the southwest of England. In Scotland the increase was 55 per cent over 1928.

To keep up the true perspective it must be borne in mind that the car remains the predominant vehicle on the road. It was 67 per cent of all motor traffic in 1928, and it was 68 per cent this year. Motorcycles have declined from 16 per cent to 11 per cent, and all classes of public-service motors and trucks have increased from 17 per cent to 21 per cent of motor traffic.

Over the country as a whole the growth of car traffic has been most noticeable in the touring districts, as this year a greater number of people took their holidays in Great Britain. This is reflected in the greater number of vehicles recorded in the West, East, North Wales, Northwest and Scotland. More motorists from the Home Counties went farther afield this year, and this helps to explain the small increase in car traffic in these counties at the time of the census.

## *Signals*

O what a joyous thing and sightly
To see a signal given rightly
And as laid down within that Code
For users of the modern road!
But, O, how often and how sadly
One sees those signals given badly!
The Code itself is not to blame,
For plainest language was its aim;
As clear as day its clauses stand:
"Extend," it says, the "arm and hand."
No doubt at all in that phrase lingers—
It does not mean "Extend three fingers,
Then snatch them in lest those behind
Should know what course is in your mind."
No, no—the Code's express command
Includes the arm as well as hand—
So stick that limb well forth and free it
That those who drive behind may see it.

But, O, how many in this land
Do not, or will not, understand,
And idly flap a languid hand,
Or portion of a feeble fist
Which might be overlooked and missed!
Why, drivers of a monster 'bus
Are often seen to signal thus,
And when they mean to change direction
Extrude two fingers for inspection.
The lordly private chauffeur lad
Is often every bit as bad:
Forth as his signal he will shove
About three inches of his glove,
And many another lazy clown
Declines to pull his window down
But signals in the same fool way
And flips a finger forth to say
To those in waiting to receive it—
"Well, that's my signal—take or leave it."
Were justice done, they would be yanked
Right off their seat and soundly spanked.

The same applies to those who sport
That gadget of the newer sort—
The little pointer, all aglow,
Flicked from the windscreen top to show
The way the driver means to go.
At night when things are dark and dead
Its message may be clearly read,
But when the sun shines bright at noon
The thing becomes a doubtful boon—
Another source, from drivers lazy,
Of signals that are vague and hazy.
The Law should act, resolved and regal,
And make its daylight use illegal.
And, anyway, these words should be
Writ up in gold for all to see:
"The clearest signal known today
Is that which hand—and arm—convey;
O let that hand its message tell—
And see the arm goes out as well!"

LUCIO.

—From *The Manchester* (England) *Guardian*.

# THE CITY'S LEGAL RIGHTS AND DUTIES

**Conducted by A. L. H. STREET, Attorney at Law**

### Accidents

City held liable for personal injury caused by fall of defective billboard from top of building (Nebraska Supreme Court: *Gilbert v. Welch Restaurant Co.*, 240 N. W. 313).

Allegations held insufficient to show that city was liable for injury to boy in explosion of gasoline tank of street-grading machine on theory of attractive nuisance (Georgia Court of Appeals: *Sewell v. City of Atlanta*, 164 S. E. 70).

City held not liable for negligent driving of fire truck, causing collision with automobile (Missouri Supreme Court: *Richardson v. City of Hannibal*, 50 S. W. 2d. 648).

### Annexation

Municipality held not empowered to annex territory in adjacent county without explicit statutory authority (Kentucky Court of Appeals: *Town of Elsmere v. Tanner*, 51 S. W. 2d. 461).

### Appropriations

Appropriations for "fire department, $34,000," etc., held void for non-compliance with statutory requirement for specification of objects of appropriation (Illinois Supreme Court: *Siegel v. City of Belleville*, 181 N. E. 687).

### Attorneys

Employment of private attorney by local improvement district violated a constitutional statute providing that city attorney should act (Arkansas Supreme Court: *Water Improvement District No. 1 of Benton v. Briner*, 48 S. W. 2d. 1104).

City held liable for reasonable value of legal services rendered under invalid contract (Texas Court of Civil Appeals: *City of Texarkana v. Keeney*, 50 S. W. 2d. 339).

### Audits

City held impliedly empowered to contract for audit of clerk's and treasurer's books (Nebraska Supreme Court: *O. M. Campbell Co. v. City of Harvard*, 243 N. W. 653).

### Business Regulations

Council held not entitled to arbitrarily refuse permit for sale of cigarettes (Iowa Supreme Court: *Ford Hopkins Co. v. City of Iowa City*, 240 N. W. 687).

### Civil Service

Civil service law is violated by removal for economy and immediate appointment of another to the position (Florida Supreme Court: *State v. Markle*, 142 So. 822).

### Condemnation Proceedings

City condemning land for public market held to acquire fee title and entitled to change use to street purposes (New Jersey Court of Errors and Appeals: *Bentley v. City of Newark*, 158 Atl. 463; *Carrol v. City of Newark*, 158 Atl. 485).

### Contracts

County's agreement to pay stated sum on breaking contract held invalid as constituting penalty rather than liquidated damages (Texas Court of Civil Appeals: *Kelly v. Cochran County*, 50 S. W. 2d. 848).

Contract for engineering services in estimating light plant improvements cost held invalid for indefiniteness and non-compliance with clerk's signature and attorney's approval (United States Circuit Court of Appeals, Fifth Circuit: *City of Ft. Pierce v. Scofield Engineering Co.*, 57 Fed. 2d. 1026).

**Important Legal Decisions**

**involving municipalities, as reported in this department during 1931, are indexed and classified in the 1932 Municipal Index, just published. This reference list, commencing on page 127 of the 1932 Index, supplements similar lists appearing in the 1931, 1930 and 1929 volumes, while the 1928 Index contains a list covering 1924 to 1927, inclusive.**

### Council Absentees

Temporary absence of councilman did not constitute a vacancy that could be filled by the mayor and council (New Jersey Supreme Court: *Gavio v. Borough of Lavallette*, 161 Atl. 42).

### Courts

Ordinance purporting to repeal an ordinance establishing a city court held void (Kansas Supreme Court: *Brown v. Arkansas City*, 11 Pac. 2d, 607).

### Finances

City held powerless to reissue its own bonds purchased before maturity (Georgia Supreme Court: *City of Dawson v. Wilkinson*, 163 S. E. 485).

Statute prohibiting issuance of warrants against insufficient funds held not to limit power to incur debt (Illinois Supreme Court: *Euziere v. Highway Commissioner of Town of Rockville*, 178 N. E. 397).

Village treasurer's omission to give required bond held not to alter status of funds deposited in bank which later became insolvent (Kansas City, Mo., Court of Appeals: *In re Bank of Mt. Moriah's Liquidation*, 49 S. W. 2d, 275).

Demand for payment of overdue bond interest coupons held not prerequisite to suit to compel payment (Florida Supreme Court: *State v. Smith*, 141 So. 318).

### Firemen

Ordinance providing for appointment of firemen by nomination by committee and confirmation by council upheld (New Jersey Supreme Court: *Hamill v. City of Clifton*, 160 Atl. 882).

### License Taxes

Peddlers of perishable products were validly exempted from license taxes imposed upon peddlers (Georgia Supreme Court: *City of Atlanta v. Kirk*, 164 S. E. 64).

### Municipal Auditoriums

Theatrical producer held not entitled to compel execution of a lease for one week for presentation of a play in a municipal music hall (Ohio Supreme Court: *State v. City of Cleveland*, 181 N. E. 24).

### Municipal Utilities

City held empowered to sell surplus electric energy to outside consumers (Washington Supreme Court: *Municipal League of Bremerton/v. City of Tacoma*, 6 Pac. 2d, 587).

Town's arrangement for a water supply to be secured in part by own plant and in part by purchase of water from nearby city upheld (Washington Supreme Court: *Blade v. Town of La Conner*, 9 Pac. 2d, 381).

### Railroads

Ordinance forbidding blowing locomotive whistles in city held not invalid as conflicting with state law (South Carolina Supreme Court: *McAbee v. Southern Railway Co.*, 164 S. E. 444).

### Taxation

Municipal personal property tax lien held superior to landlord's lien for rent (New Jersey Court of Chancery: *Chase Brass & Copper Co. v. Bart Reflector Co.*, 161 Atl. 54).

Masonic Temple building held not exempt from taxation as being devoted to a "charitable purpose" (Illinois Supreme Court: *People v. Rockford Masonic Temple Assn.*, 181 N. E. 428).

### Toll Bridges

City held entitled to maintain municipal toll bridge across river under authority from Legislature (Florida Supreme Court: *Day v. City of St. Augustine*, 139 So. 880).

### Traffic Regulations

Statute limiting length of vehicles and loads on highways upheld (United States District Court, Eastern District of Illinois: *Contract Cartage Co. v. Morris*, 59 Fed. 2, 437).

### Water Supply

Missouri city held empowered to supply water to Kansas consumers (Missouri Supreme Court: *Speas v. Kansas City*, 44 S. W. 2d, 108).

Proceedings for election to authorize metropolitan water district bonds held not invalid for failing to specify location of water system, etc. (California Supreme Court: *Metropolitan Water District of Southern California v. Burney*, 11 Pac. 2d. 1095).

Prepared by
FRANK B. WILLIAMS
Author of "The Law of City Planning and Zoning"

# ZONING and PLANNING NOTES

From Data collected by the Zoning Committee of New York (233 Broadway)

## Non-Conforming Use

CONNECTICUT.—*Town of Darien v. Webb*, Supreme Court, October 26, 1932, reported in *U. S. Daily*, November 11, 1932.—The defendant is the owner of premises in a residential zone with a building on them constructed as a dwelling. The zoning ordinance was adopted December 10, 1925. At that date the building was rented and used for a restaurant and tea room, and continued to be so used until about February 1, 1927. Thereafter the building was idle, then rented as a residence, then used for business, then idle, then rented and used as a restaurant and tea room, then used partly as a store, partly as a residence. The question is, whether the uses subsequent to December 10, 1925, constitute a continuance of a non-conforming use, the defendant claiming now the right to use it for business. The ordinance provides that a "non-conforming use existing at the time of the regulations may be continued."

The main claim of the defendant is that the regulations contain no provisions as to how or under what circumstances the right to a non-conforming use existing at the time of passage is terminated, as by devotion of the premises to a conforming use, and that the right is not lost, but remains available for exercise by resumption unless and until the building is so altered as to be no longer adapted to non-conforming uses. No such alterations were made in this case.

In determining the scope and meaning of the phrase "may be continued" we must look at the object of the restrictions and the exceptions to it as set forth in the Supreme Court's opinion:

"The ultimate object of zoning ordinances is to confine certain classes of buildings and uses to designated localities or districts. The continued existence of non-conforming uses is inconsistent with that object and it is intended that conditions be reduced to conformity as speedily as possible without working substantial injustice to the interests of those who are making non-conforming uses of property at the time of the adoption of the regulations. Avoidance of such injustice is the purpose of exceptions such as are contained in section V.

"The accepted method of accomplishing the ultimate object is that, while the alien use is permitted to continue until some change is made or contemplated, thereupon, so far as is expedient, advantage is taken of this fact to compel a lessening or suppression of the non-conformity . . .

"From the purpose of the restriction and the exception now under consideration it is plain that 'continue' is employed in the sense of to keep up or maintain a particular condition, course, or series of actions without such intervention as will break the continuity . . .

"Under this construction temporary non-occupancy of the premises or interruption or suspension of a non-conforming use without substitution of a conforming use or conduct significant of abandonment would not work a termination of the right to resume the former, but this result ensues from such a definite and substantial departure from the previously existing conditions and nature of use as is constituted by the use of the defendant's premises for residence purposes in 1927 and 1928. The resumption of business uses thereafter cannot fairly be regarded as a 'continuation' of the business uses which preceded the period of residential occupancy.

"We do not attach the significance claimed by the defendant to the absence from the Darien regulations of the specific provisions, found in some zoning ordinances, concerning the effect of abandonment or discontinuance of a non-conforming use, or of a change therefrom to a conforming use, upon the right to thereafter resume a non-conforming use. . . .

"In view of the effect of the change of use under our construction of the regulations, it would be immaterial if, as the defendant claims, the owner, notwithstanding such change, entertained an unmanifested intention not to permanently abandon use of the property for business purposes."

In upholding the refusal of the trial court to allow a reversion to the non-conforming use, the Supreme Court said:

"Upon the facts found, the trial court concluded that the defendant, having for a substantial period voluntarily ceased to use his property for non-conforming purposes and devoted the use of it to residential purposes, has lost the protection which was his under section V of the regulations, can not now avail himself of the exemption accorded him under that section, and may not use the premises for or revert to the non-conforming use which was existing at the time when the zoning regulations were adopted. For the reasons which we have stated we hold this conclusion to be warranted by the facts and sound in law."

INDIANA.—*O'Connor v. Overall Laundry, Inc.*, Appellate Court, November 23, 1932.—The defendant is the lessee of a lot in a residential district. On it is situated a non-conforming laundry consisting of two buildings. The lessee applied to the Building Commissioner for permission to connect the two buildings by roofing-in and walling an area between them as an engine room. The permission was refused and an appeal taken to the Board of Zoning Appeals. The appeal was denied, and the case was taken to the Marion Superior Court and there granted. Thereafter the case was taken to this Court.

It appears that the Board of Zoning Appeals has been given authority in its discretion to allow the extension of a non-conforming use, and to grant relief in cases of practical difficulties or unnecessary hardships. *Held* that the Board of Zoning Appeals was right in refusing to grant the variance asked for. The roofing-over and walling-in is not a reconstruction or structural alteration. It is not a practical difficulty or unnecessary hardship within the meaning of the statute to compel defendant to continue in cramped quarters. The denial of the request to extend the non-conforming use was not an abuse of the discretion of the Board.

## Nuisance—Zoning Ordinance as Defense

MASSACHUSETTS.—*Beane v. H. K. Porter, Inc.*, 182 N. E. 823 (October 28, 1932).—The plaintiffs, owners of a dwelling in an industrial district in the city of Everett, seek to enjoin the defendant, a manufacturer, from using an adjoining drop forge hammer establishment, which is found to be a nuisance. The defendant attacks this finding on the ground that the operation of the hammers is made lawful by a zoning ordinance of the city. *Held* that the operation of the hammers is not made lawful by the zoning ordinance.

The Court cites with approval a portion of the leading case in point, *Munhall v. Holbrook*, 276 Mass. 341, 348 (digested in these Notes for December, 1931), as follows: A "zoning ordinance is not in its legal effect like a license or legislative sanction to carry on in a district every kind of business that may not be expressly excluded therefrom, and if there are reasons apart from the zoning law why the business may not legally be carried on in the district, the zoning law . . . furnishes no protection to it."

NEW YORK.—*Haber v. Paramount Ice Corporation*, Supreme Court, Kings County, reported in *New York Law Journal*, November 16, 1932.—The plaintiff brings this action to restrain the defendant from operating its ice plant on premises immediately adjoining his, on the ground that it is a private nuisance. The properties are in an unrestricted building zone district. The plaintiff erected and began to occupy the building on his premises as a residence before the defendant began his operations. *Held* that the ice plant is such a nuisance. The defense that the ice plant is in an unrestricted locality, and operated with the most modern machinery and in a most careful manner, is no defense.

## Pending Zoning Ordinances

NEW JERSEY.—*Atlantic Broadcasting Co. v. Wayne Township*, 109 N. J. Law Rep. 442 (October 17, 1932).—This case has been most interestingly reviewed by Spaulding Frazer in his page in the December issue of *New Jersey Municipalities*. We quote from this review as follows::

"The facts present the simple question of whether the issuance by a building inspector of a building permit in accordance with existing ordinances might be set aside by the township committee where the action of the building inspector would contravene the provisions of a proposed zoning ordinance not yet introduced. The case comes to the court in a somewhat different way than did several applications for mandamus to compel the issuance of building permits where they had been refused by the building inspector on the ground that a zoning ordinance was about to be adopted. It will be remembered that in a number of those cases the Supreme Court held that where a reasonable time had not elapsed for the perfection of a zoning ordinance after the adoption of the Enabling Act of 1928, the Court would not use its discretion to enforce against the municipal authorities the issuance of permits for building which the municipality hoped to exclude, if evidence of good faith and willingness on the part of municipal authorities in the preparation of the zoning ordinance appeared to the Court's satisfaction. In later cases the withholding of the writ of mandamus was denied on the ground that

ample opportunity had been afforded for the perfection of the zoning ordinance and that the Court would no longer regard contemplated legislation as controlling its discretion.

"In the present case it will be noted that the matter comes before the Court in exactly the other way, the permit having been issued in accordance with existing law and its issuance sought to be revoked by reason of the alleged provisions of the zoning ordinance in contemplation. The situation thus is quite different and the Court confines itself to the consideration of the strictly legal situation, finding no power in the township committee to pass the resolution revoking the permit and establishing the permit previously issued by the building inspector. In doing so, the Court points out certain equities in the nature of legitimate expense which the prosecutor had been placed to in preparation of plans for the building's construction, but from the legal reasoning it would seem that the conclusion would have been the same even without these equitable considerations."

### Garage—Temporary Permit

NEW YORK.—*De la Torre Bueno v. Board of Appeals, New Rochelle*, Supreme Court, Westchester County (William X. Reed, Referee), reported in *Standard Star*, December 1, 1932.—Permit granted for a filling station in a former residential neighborhood now a business district, on the ground that it was the only profitable use to which the property could be put at the present time. The referee recommends the granting of the permit with a modifying direction that when circumstances so change by the development of the city as to make a business structure needed in the district, the filling station be removed.

### Filling Station—Pump on Sidewalk

OKLAHOMA.—*City of Stillwater v. Lovell*, 15 Pac. 2d, 12 (October 11, 1932).—Lovell, in connection with his filling station, was granted a permit to erect and maintain a pump on the sidewalk, and is attempting to restrain the public from so using the adjacent sidewalk as to interfere with the use of the pump. *Held* that a municipality, in the absence of express legislative authority, is without power to license private individuals to make a permanent use of a street interfering with its public use.

### Consent Zoning

OREGON.—*Roman Catholic Archbishop v. Baker*, 15 Pac. 26, 2d, 391 (October 18, 1932).—The plaintiff seeks to erect a parochial school in a Class I residential zone of the city of Portland in which such a use is permitted only on approval of the City Council. Proceedings for such approval, except those initiated by the Council or the City Planning Commission, must be by petition. If it should be deemed that the construction of a school building would change that property from Class I to a less restricted district, then the owners of 50 per cent of the property within the area affected must sign the petition. *Held* that this ordinance, if neither the Council nor the Planning Commission will initiate proceedings for a change, leaves the party desiring a change to the caprice of the will of this 50 per cent of the property owners, and is, in this respect, arbitrary and void.

# Obsolete Housing Revealed by the 1930 Census

*By* EDITH ELMER WOOD

SOME of the new material just becoming available from the 1930 Census should prove helpful in preliminary studies for slum clearance and large-scale housing operations, with or without R. F. C. loans. For the first time the Census is giving us nation-wide figures on house rents and on values of owned homes.

There is a table on Rented Non-Farm Homes by Monthly Rental, by States, which especially repays study. A trifle more than a third of all such homes (34 per cent) rent for less than $20. Roughly, at least, these must be the obsolete structures appropriate for demolition. The median rent is $27.15. More than 80 per cent pay less than $50. These figures would apply locally, of course, only in an absolutely average community, which, perhaps, does not exist. But they afford a useful point of departure.

Turning to the states, we find their median rents ranging from $41.94 in the case of New York ($39.69 for Illinois, $37.90 for Michigan, and $37.49 for New Jersey) to those of South Carolina, Alabama and Mississippi, which are all under $10. In South Carolina 81.9 per cent of renting families pay less than $20, in Alabama 76.7 per cent, and in Mississippi 75.6. After making allowance for lower cost of land and of building in the South and for structural differences incident to climate, one can hardly avoid the conclusion that there is a great deal of sub-standard housing in those states. And after allowing for the higher wage and salary scales of the metropolitan states, one is forced to the conclusion that rents there are unwholesomely high.

The figures concerning owned non-farm homes suggest, as would be expected, that they average considerably superior to rented homes. Thus, their median value for the United States is $4,778. Accepting 12 per cent gross as a normal rent, that would correspond to a monthly rental of $47.78, which is nearly 76 per cent higher than the actual median of rented homes. On the same hypothesis, homes valued at $2,000 correspond to rentals of $20 per month. Only 18.1 per cent of owned non-farm homes fall in the under-$2,000 class.

Even so, their number would be around 1,900,000, while 34 per cent of rented homes would be in the neighborhood of 4,200,000. If these are the obsolete non-farm homes which, generally speaking, need replacement, the task would appear large enough to afford employment to a large section of the unemployed for some years. To these must be added a probably equal number in need of modernization and some millions of farm homes, which have not yet come into the picture, but are known to be extensively lacking in improvements. The farm census shows some progress in this respect over 1920, but even now only 13.4 per cent of farm homes have electric lighting, and only 15.8 per cent have water piped into the house.

All this implies an enormous potential demand. The question is how much of it can be made effective by lowered costs?

### *Oklahoma Has Radio Talks on Government*

THE University of Oklahoma, Norman, Okla., is sponsoring a series of radio talks on government, at 9:15 p. m. on alternate Thursdays, including Jan. 12 and 26. (See p. 53 for the new nation-wide N. B. C. series, and p. 60 of the December issue for the New York State series.)

### *An Omission*

IN the description, on page 84 of THE AMERICAN CITY for December, of the new City Hall and War Memorial of Newton, Mass., shown on the front cover of that issue, credit to Olmsted Brothers, landscape architects, Brookline, Mass., for the very effective treatment of the surroundings, was inadvertently omitted.

# The Municipal Bond Market

THE following is a representative list of recent sales of new issues of state and local bonds, taken from current numbers of *The Bond Buyer*.

| Amount | City or Other Public Body | Rate (%) | Term (Years) | Basis (%) |
|---|---|---|---|---|
| $30,400,000 | New York State | 3.1266 (avg.) | 12.14 (avg.) | 3.0273 |
| 5,000,000 | New Jersey | 3¼ | 1-8 (ser.) | 3.19 |
| 320,000 | Schenectady, N. Y. | 3.60 | 4.88 (avg.) | 3.55 |
| 425,000 | Minneapolis, Minn. | 4 | 3.94 (avg.) | 3.79 |
| 6,972,000 | St. Louis, Mo. | 4 | 12¼ (avg.) | 3.84 |
| 640,000 | Richmond, Va. | 4 | 30¾ (avg.) | 3.92 |
| 100,000 | New Britain, Conn. | 4 | 11 1/6 (avg.) | 4.03 |
| 197,000 | Garden City, N. Y. | 4½ | 5¾ (avg.) | 4.29 |
| 2,534,000 | White Plains, N. Y. | 4.44 (avg.) | 14.7 (avg.) | 4.411 |
| 20,000,000 | Illinois | 4½ | 7 (avg.) | 4.42 |
| 235,000 | Westerly, R. I. | 4½ | 13.57 (avg.) | 4.57 |
| 146,000 | Vigo County, Ind. | 5 | 6 1/6 (avg.) | 5.00 |
| 700,000 | Salt Lake City, Utah | 4½ | 5½ (avg.) | 5.15 |
| 466,000 | Muskegon, Mich. | 5½ | 3-10 (ser.) | 5.60 |
| 500,000 | Spokane, Wash. | 5¾ | 11 1/6 (avg.) | 5.74 |
| 1,372,000 | Cleveland, Ohio | 6 | 9.65 (avg.) | 5.99 |
| 186,000 | Garwood, N. J. | 6 | 21 5/6 (avg.) | 6.26 |

# MUNICIPAL AND CIVIC PUBLICATIONS

**Prices quoted do not include postage, unless so stated.**

### Highway Finance

The American Road Builders' Association Bulletin No. 30 presents the report of the County Committee on Legislation, Administration and Finance on the management of county highway operations as regards (1) Uniform Accounting, (2) General Requirements—Specification Forms, (3) Purchasing Equipment Practices. Skeleton forms are given which conform to fundamental accounting principles and apply to counties of low valuation, with supplementary forms for counties of medium and high valuations. They may be extended or elaborated to suit circumstances. It is desired to establish a basis not only for recording costs and predicting future costs but for comparing costs of one year with another in the various counties. This would tend to greater efficiency, and to increased confidence on the part of the taxpayers. The points that should be included in standard specification and contract forms are given. Clear-cut recommendations are made for efficient and economical practices in buying highway equipment. 50 pp. (Apply to the Association, National Press Bldg., Washington, D. C.)

### Public Works

The Proceedings of the Thirteenth Annual Conference of the International Association of Public Works Officials, which took place in Pittsburgh, Pa., September 29-October 1, 1932, appear as a well-edited and well-printed booklet of 71 pages. Included in it are addresses on the following topics: Modern Methods of Garbage Collection; Street Cleaning, Its Efficiency, and Relation to Reduced Budgets; The Use of Mechanical Equipment and the Cooperation of the Public; Locating an Incinerator; Long-Range Planning of Public Works; English and European Public Cleansing Methods; Accounting for Payrolls and Equipment; Purchase and Storage of Materials and Supplies; Economic Re-adjustment; Sewage Disposal; Sewer Maintenance and Catch-Basin and Inlet Cleaning; Maintenance and Dust Prevention on Dirt Streets; Management and Care of Municipal Equipment; and Unemployment Relief. (Apply to the Association, 100 North La Salle St., Chicago, Ill.)

### Sludge Digestion

Reprints from the *Sewage Works Journal* of March, May, July and September, 1932, are combined in a pamphlet of 52 pages issued by the Harvard Engineering School as No. 84 for 1932-33, under the general title, "Heat and Energy Relations in the Digestion of Sewage Solids." The co-authors of the four papers are Gordon M. Fair and Edward W. Moore, Associate Professor of Sanitary Engineering, and Research Assistant in Sanitary Engineering, respectively, The Harvard Engineering School, Cambridge, Mass. The papers are: I, "The Fuel Value of Sewage Solids"; II, "Mathematical Formulation of the Course of Digestion"; III, "Effect of Temperature of Incubation upon the Course of Digestion"; IV, "Measurement of Heat and Energy Interchange." (Apply to the School.)

### Land Economics

*Rent Liens and Public Welfare: An Economic and Legal Adjustment of Industry.—By Clarence J. Foreman, Ph.D., Associate Professor of Economics, University of Cincinnati. The Macmillan Company, New York.* 1932. *VII* + 207 *pp.* $2.00.

This volume is one of the Land Economics Series, edited by Richard T. Ely, Ph.D., LL.D., Director of the Institute for Economic Research. The growth of the legal process of statutory and contract rent liens, which affects a large proportion of our population, is described, and is shown to present a violation of early American common law by courts and legislatures, and to interfere with the proper adjustment of law to the economic rights of industry and the individual. A return toward the simpler common-law principle of actual distraint, with safeguards to both tenant and landlord, is recommended.

### Government and Administration

*German Cities: A Study of Contemporary Municipal Politics and Administration.—By Roger Hewes Wells, Ph.D., Associate Professor of Politics in Bryn Mawr College. Princeton University Press, Princeton, N. J.* 1932. *XIII* + 283 *pp.* $3.00.

This is a readable explanation of puzzling things and a valuable reference work. It answers many questions inspired by the daily news reports from Germany, and presents its information in carefully classified form adapted to its complicated subject. After briefly reviewing the experiences and accomplishments of German cities before, during and after the World War, the author explains the various types of local self-government in Germany and then the structure of city government. The chapter on Municipal Suffrage and Elections is particularly needed for illumination on current events, together with the following one on Partisanship and Parties in German Cities. The States and the Cities, and The Reich and the Cities, are two coordinated chapters. A study of Metropolitan Areas and Problems deals with the conflict of jurisdiction between cities and between city and county or rural authority, or even between two or more states in an area which is otherwise—geographically, economically and socially—a unit. The general aspects of municipal administration are presented in a chapter whose most interesting section is on Financial Administration and Control.

The author's style is so clear and direct that it is not the student-reader's understanding which will be taxed—only his memory; and the volume should be on his bookshelf to refer to.

### Planning and Zoning

At the fourth semi-annual conference of the Westchester County Planning Federation, held November 11, 1932, at White Plains, N. Y., a "Review of Local Planning and Zoning Laws and the Legislative Acts Authorizing Them" was presented by Paul A. Bankson, President of the Federation, and City Plan Engineer, New Rochelle, N. Y. The paper discusses the need of standard regulations for up-to-date zoning and planning; of an adequate enabling act to meet conditions which experience has revealed; of changes in the law to make consent zoning reasonable and effective; of proper practice in the matter of special assessments; of county planning that shall cooperate with local planning; of giving the Board of Appeals power to permit reconditioning of large old homes to fit modern use; and, in other matters, the need of definite, clearly understood planning and zoning provisions for the general good. While of special application in Westchester County, this paper, with illuminating reasonableness, presents principles of general interest. Mimeographed copies are available. (Apply to Mr. Bankson, at New Rochelle, N. Y.)

### Schools

*Report of the Survey of the Schools of Chicago, Illinois.—By the Division of Field Studies, Institute of Educational Research, Teachers College, Columbia University; George D. Strayer, Directors; N. L. Engelhardt, Associate Director,* 1932. *5 volumes, paper-bound.* $3.50 *from* THE AMERICAN CITY.

These volumes are an excellent example of a readable and well-presented report. They discuss policies in general as well as in particular, and are filled with concrete suggestions for improving the efficiency and reducing the expenses of Chicago's schools. Volume I (350 pp.) consists of the following sections: Administration; Business Management; Financing the Schools; Educational Personnel; Social Services. Volume II (323 pp.): Fitting the School to the Pupil; Secondary Education; Higher Education. Volume III (227 pp.): Curricula; Teaching and Supervision in the Elementary Schools; Health and Physical Education; Vocational Education. Volume IV (315 pp.): Housing the Schools; Operation of the School Plant. Volume V (137 pp.): Summary of Findings and Recommendations.

### Water Works

*The Sanitation of Water Supplies.—By Murray P. Horwood, Associate Professor, Department of Biology and Public Health, Massachusetts Institute of Technology. Published by Charles C. Thomas, Springfield, Ill.* 1932. 181 *pp.* $3.00 *from* THE AMERICAN CITY.

This book is not an exhaustive treatise of the engineering, laboratory, or public health aspects of water supplies, but presents a well-worded discussion of each phase as a textbook for general students of municipal sanitation and public health. It includes chapters on the general subject of municipal sanitation and public health, the development of municipal water supplies, sources, uses and consumption of water, the requirements of a potable water supply, water as a vehicle of disease, the purification and improvement of water supplies, water softening, slow sand filtration, rapid sand filtration and the disinfection of public water supplies.

### Rural Roads

"Lifting the Farmer Out of the Mud," by Gifford Pinchot, has been reprinted from *The New Republic* of Oct. 19, 1932, and is distributed by The Asphalt Institute, 801 Second Ave., New York. Since the State Legislature of Pennsylvania transferred 20,000 miles of dirt roads from the counties and townships to the state highway system, the state has been building all-weather highways for $6,000 a mile or less; a roadbed 20 feet wide, adequately drained; on the center a road 14 to 16 feet wide. This article gives the details of construction and maintenance, and shows the beneficial results, economically and socially, with special reference to the purchase of equipment and materials and distribution of work among the needy unemployed. 4 pp. (Apply to the Institute.)

### Motor Vehicles

"The Problem of Motor Vehicle Regulation, with Special Attention to the Movement of Highway Traffic Across State Lines," is the subject of a 16-page article by H. H. Kelly, Division of Highway Transport, U. S. Bureau of Public Roads, in the December number of *Public Roads*. The purpose of the paper is "to consider this whole question of motor-vehicle regulation in the United States, and to reduce its intimidating complexity to a manageable set of individual elements." 10c. (Apply to the Superintendent of Documents, Washington, D. C.)

### Land Speculation

*The Great American Land Bubble: The Amazing Story of Land-Grabbing, Speculations, and Booms from Colonial Days to the Present Time.—By A. M. Sakolski, Assistant Professor of Finance, College of the City of New York. Harper & Brothers, New York,* 1932. *XII* + 373 *pp. Illustrated.* $3.50.

There was land grabbing in Colonial days, which, after the Revolution, became wild speculation in purchases of land made for immediate resale, often without accurate description of boundary limits or valid title. Quick gain in large sums was the basis of activity in real estate, with no thought of the development of land under proper conditions for health, safety, and community progress and welfare. Here is an astonishing panorama of adventurous action by men of names familiar in history. The period most vividly unrolled is that of the first half of the nineteenth century, but the picture continues in rich detail throughout the Florida boom. Few were the benefits that accompanied this orgy of getting a great deal for almost nothing. Fraud and corruption and panic were its characteristics and its results. The whole country itself was in its beginning a speculation, and parts of its vastness have throughout the years continued the fantastic story. The chapter headed "Main Streets" and "Broadways" tells of placing on the map many a new metropolis and suburban development not necessarily with fraudulent purpose, in certain instances with high ideas of city development and always with intense energy.

### Airways and Airports

The Aeronautics Branch of the U. S. Department of Commerce published on September 1, 1932, Airway Bulletins No. 1 and 2: "General Airway Information"; "Descriptions of Airports and Landing Fields in the United States." These bulletins supersede the loose-leaf airway bulletins published by the Aeronautics Branch on matters essential to the safe and reliable operation of aircraft in cross-country operations. They will be revised as needed, and meantime changes and developments will be announced in the semi-monthly Air Commerce Bulletin of the Aeronautics Branch. No. 1 (218 pp.) presents, with many maps and diagrams, details of the functioning and equipment of the Federal airways system, radio facilities, beacon lights, weather service, etc., as a means of securing the safety and convenience of airmen. No. 2 (185 pp.) includes all airports and landing fields recorded with the Aeronautics Branch, presented alphabetically by states. The standardized descriptions furnish the outstanding essential facts desired by airmen contemplating flights to unfamiliar fields. (Apply to the Aeronautics Branch, Dept. of Commerce, Washington, D. C.)

### Highways

"Proceedings, Twenty-Ninth Annual Convention, American Road Builders' Association, January 11-15, 1932, Detroit, Mich." Forty-two of the committee reports of the Association appear in full in bulletin form in this book. There is also a list of exhibitors at the Twenty-Third Annual Road Show. 711 pp. Illustrated. It is stated that these bulletins give a very good cross-section of the committee activity of the Association for the past year, and have been selected for their utility to the greatest number of interests connected with the construction, maintenance and operation of highways. $5.00. Free to members of the Association. (Apply to the Association, National Press Bldg., Washington, D. C.)

### Aerial Maps—City Planning—City Managers

"Progress in Aerial Surveying," by L. O. Stewart, Assistant Professor of Civil Engineering, Iowa State College; "The Spencer Conflagration and Town Planning," by Lindon J. Murphy, Municipal Engineer, Engineering Extension Service, Iowa State College; "The Field for City Managers in Iowa," by P. F. Hopkins, City Manager, Mason City, Iowa; these three articles are reprinted, in a 16-page pamphlet, from the 1932 Proceedings of the Iowa Engineering Society. "The great advantage of the aerial method lies in the completeness and accuracy of the detail."—"It has cost Spencer over a million dollars not to plan—not to build safely."—"There is no question but that the engineer is in a favorable position for consideration for the position of city manager wherever that position is open." (Apply to the author of the first article, Iowa State College, Ames, Iowa.)

### Group Leadership

"Junior Manual with Lessons for Leadership within a Group and Parliamentary Procedure"; and "Instant Use Manual for Leadership within a Group and Parliamentary Procedure"; by O. Garfield Jones, Ph. D., Professor of Political Science, University of the City of Toledo, Toledo, Ohio. The Junior Manual is an important contribution to citizen-ship education in the public schools. It contains an arbitrary simplification of Robert's Rules of Order for Junior High School use—a procedure which the author believes should be taught to all pupils somewhere in the seventh, eighth, or ninth grade; the Senior Manual is designed to be taught only to the superior and more ambitious students in the Senior High School. These Manuals have been developed through the author's own experience in training students in the technique of group leadership, and are in successful use by other educators. They have a very definite value in the proper conduct of club meetings by both young people and adults. They teach by actual doing, and they present a unique method of quickly determining a point of correct procedure at the moment of needing it. Each Manual, paper-bound, $1.00; cloth-bound, $1.25. In lots of 10 or more: Junior Manual, 60c each; Senior Manual, 50c each. (Apply to the author, at the address given above.)

### Housing

*Farm and Village Housing.—Report of the Committee on Farm and Village Housing (Albert Russell Mann, Chairman); prepared for the Committee by Bruce L. Melvin; edited by John M. Gries and James Ford. XVIII + 293 pp. Illustrated. Volume VII of the publication of the President's Conference on Home Building and Home Ownership.* $1.15 *prepaid.*

*Home Ownership, Income and Types of Dwellings.—Reports of the Committees on Home Ownership and Leasing (Ernest T. Trigg, Chairman), Relationship of Income and the Home (Niles Carpenter, Chairman), and Types of Dwellings (John Ihlder, Chairman); edited by Messrs. Gries and Ford, assisted by James S. Taylor. XVIII + 230 pp. Illustrated. Volume IV.* $1.15 *prepaid.*

We have here the first volume on rural housing in America, covering its actual physical conditions, the difficulties in the way of improving them, but also methods by which this can be accomplished; the problem of financing house building and improvement, and the matters of taxation and insurance; the relation of standards of rural homes to national welfare; and much practical, constructive help toward realizing the fruits of wider research and dissemination of information.

In Volume IV are considered the conditions under which home ownership is preferable to renting, and the ways in which ownership may be stimulated and difficulties prevented in acquiring, holding, managing and leasing dwellings; the relationship of income and the home, with special studies of low-cost housing projects, and of housing costs and other home ownership conditions of 789 native-born families in Buffalo, N. Y., having an income of $3,000 or less in 1930; varieties and types of dwellings, trends in construction, the relative merits and costs of the prevailing types, and the effect of land value on them.

*Housing Objectives and Programs.—General Sessions of the Conference. Addresses by President Hoover, Secretary Wilbur and Mrs. Jane Deeter Rippin; resolutions adopted by the Conference; resolution presented by the Puerto Rico delegation. Also reports of the Correlating Committee on Technological Developments (George K. Burgess, Chairman); Legislation and Administration (Bernard J. Newman, Chairman); Standards and Objectives (Lawrence Veiller, Chairman); Education and Service (Albert Shaw, Chairman); Organization Programs, Local and National (Harlean James, Chairman); Research (James Ford, Chairman). Edited by Messrs. Gries and Ford. XXV + 345 pp. Illustrated. Volume XI, the final one of the series. All the previous volumes have been reviewed in* THE AMERICAN CITY. $1.15 *prepaid.*

*Checks should be made payable to James Ford, Editor, and orders should be sent to the President's Conference on Home Building and Home Ownership, New Commerce Bldg., Washington, D. C.*

### City Administration in Europe

"Some Observations on Municipal Practices in European Cities," by Donald C. Stone, Research Director, The International City Managers' Association, and Alice B. Stone. 158 mimeographed pp. This is a report of three months' investigation along four principal lines: public cleansing methods and cost accounting; street maintenance technique and records; financial and budgetary procedure; and police records, identification, and investigation methods. Other problems which interested the authors were: the recruitment and training of public personnel; organization and work of professional associations of officials; relation of local governments to central governments; the use of grants in aid; regulation of street use, and control over encroachments by private parties into the street area; report of public activities to the citizens; and governmental housing undertakings. Nov., 1932. (Apply to the Association, 923 E. 60th St., Chicago, Ill.)

### Rural Health Service

"Extent of Rural Health Service in the United States, 1928-1932." In the United States Treasury Department *Public Health Reports* for Dec. 16, 1932, there are 16 pages of data received from state health departments showing by tables and a map and a chart how the rural sections of counties, townships and districts are protected by whole-time health service. 5c. (Apply to the Superintendent of Documents, Washington, D. C.)

### Highway Engineering

The Eighteenth Annual Conference on Highway Engineering was held at the University of Michigan, February 16-18, 1932, under the direction of the College of Engineering, with the cooperation of the Michigan State Highway Department and the Michigan Association of Road Commissioners and Engineers. Its Proceedings are published in a paper-bound book of 285 pages illustrated with views, forms, charts, and diagrams. The subjects discussed include various methods of highway construction and maintenance and improvement; The Effect of Dust Layers on Roadside Trees; Michigan's Winter Program in Relation to the Engineer and Unemployment; Right-of-Way Policies and Procedure; Public Relations of Highway Departments; various studies of railroad-crossing and traffic signal systems; several papers on the control of traffic accidents; A Scenic Highway around Lake Superior; and Aeronautics in Michigan. A Cumulative Table of Contents, 1915-1932, is included. (Apply to the University of Michigan, Ann Arbor, Mich.)

### A. S. T. M.

The 1932 Book of A. S. T. M. Tentative Standards, issued by the American Society for Testing Materials, includes all the 226 tentative specifications, test methods, definitions of terms and recommended practices effective as of Oct. 31, 1932; 47 of this number were accepted for publication for the first time in 1932. The groups include: ferrous metals; non-ferrous metals; cement, lime, gypsum, concrete and clay products; preservative coatings, petroleum products and lubricants; road materials; coal, coke, timber, timber preservatives, shipping containers, waterproofing and roofing materials, slate and building stone; electrical insulating materials; rubber products; textile materials, and miscellaneous subjects. 1,236 pp. Cloth-bound, $8.00; heavy paper binding, $7.00. (Apply to the American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa.)

### Town and Regional Planning

A new and larger quarterly review, *Town & Country Planning*, has taken the place of *Garden Cities and Town Planning*, under the same publishers, The Garden Cities and Town Planning Association, 3, Gray's Inn Place, London; W. C. 1, England. Vol. 1, No. 1, issued in November, states that the title of the new quarterly indicates one of the main changes brought about by the Town and Country Planning Act, 1932—the extension of the scope of planning. An analysis of the provisions of the Act is given on pages 7-9 of this issue. The Act gives a complete code governing the future development of the whole country. Pleasing typography and arrangement and up-to-date material on progress in town and regional planning, housing, road construction, and home equipment, make this review direct in its appeal to the interest of readers. Yearly subscription 5 shillings. (Apply to the publishers.)

### Accident Prevention

In a 40-page pamphlet entitled "The Use of Accident Records" Burton W. Marsh, Traffic Engineer of the city of Philadelphia, deals incisively with the duty of gathering accident facts in significant records and of making use of these records to develop effective remedial methods of accident prevention. Numerous views, charts and diagrams illustrate traffic conditions tending to accidents, methods of relieving bad conditions and forms for accident reporting. The information is detailed, and analytically presented, and the recommendations are constructive. It is emphasized that in spite of unaroused public opinion, of the lack of full-time personnel at work on the use of accident records, and of general lack of knowledge of what should be done and how to do it, inactivity is not justified. 25c. (Apply to Burton W. Marsh, 537 City Hall, Philadelphia, Pa.)

### Parks

The "Act Creating Maryland-National Capital Park and Planning Commission with Amendments" has been published by the Commission in a pamphlet of 44 pages; also a map of the Maryland-Washington Metropolitan District. 25c each. (Apply to Irving C. Root, Chief Engineer of the Commission, County Bldg., Silver Spring, Md.)

# CONVENTIONS—WHEN AND WHERE

**(Figures in parentheses following the name of the convention city indicate the estimated attendance other than local)**

JANUARY 12-14.—WASHINGTON, D. C. (50)
*American Engineering Council. Annual meeting.* Executive Secretary, L. W. Wallace, 744 Jackson Place, Washington, D. C.

JANUARY 14.—PROVIDENCE, R. I.
*Rhode Island Town and City Clerks' Association. Annual meeting.* Secretary, Alice A. Tonge, Deputy Town Clerk, Town of Warwick, Apponaug, R. I.

JANUARY 16-20.—DETROIT, MICH.
*Highway and Building Congress.* The following are listed among the participating organizations: *American Road Builders' Association, The Asphalt Institute, National Paving Brick Association, Portland Cement Association and American Society of Municipal Engineers.* Write: Charles M. Upham, Engineer-Director, American Road Builders' Association, National Press Building, Washington, D. C.

JANUARY 16-19.—TEMPLE, TEXAS.
*Texas Water Works Short School. Annual session.* Address: V. M. Ehlers, Austin, Texas.

JANUARY 17-18.—WASHINGTON, D. C.
*National Rivers and Harbors Congress. Annual congress.* Secretary-Treasurer, S. A. Thompson, 824 Colorado Building, Washington, D. C.

JANUARY 17.—NEW YORK.
*New York State Sewage Works Association. Annual meeting.* Secretary-Treasurer, A. S. Bedell, State Department of Health, Albany, N. Y.

JANUARY 18-20.—NEW YORK.
*American Society of Civil Engineers. Annual meeting.* Secretary, George T. Seabury, 22 West 39th Street, New York.

JANUARY 19.—BOISE, IDAHO. (250)
*Idaho State Chamber of Commerce. Annual meeting.* Secretary, L. F. Parsons, 529 Idaho Building, Boise, Idaho.

JANUARY 23-27.—NEW YORK.
*American Institute of Electrical Engineers. Annual winter convention.* Assistant National Secretary, H. H. Henline, 33 West 39th Street, New York.

JANUARY 23-25.—CINCINNATI, OHIO. (400)
*American Society of Heating and Ventilating Engineers. Annual meeting.* Secretary, A. V. Hutchinson, 51 Madison Avenue, New York.

JANUARY 23-25.—CAMBRIDGE, MASS. (50)
*American Society of Landscape Architects, Inc. Annual meeting.* Executive Secretary, Bradford Williams, 9 Park Street, Boston, Mass.

JANUARY 23-25.—CHICAGO, ILL. (100)
*Illinois Society of Engineers. Annual meeting.* Secretary-Treasurer, H. E. Babbitt, 1108 South Lincoln Avenue, Urbana, Ill.

JANUARY 23-27.—LAFAYETTE, IND. (600)
*Purdue Road School. Annual school.* Address: Professor Ben H. Petty, Engineering Extension Department, Purdue University, Lafayette, Ind.

JANUARY 26-27.—WINTER HAVEN, FLA. (400)
*Florida League of Municipalities. Semi-annual meeting.* Secretary-Treasurer, E. P. Owen, 1201 Lynch Building, Jacksonville, Fla.

JANUARY 26.—BOSTON, MASS.
*Massachusetts Association of Boards of Health. Annual meeting.* Secretary, George T. Lennon, Department of Health, Haverhill, Mass.

FEBRUARY 7-8.—OTTAWA, ONT. (250)
*Engineering Institute of Canada. Annual meeting.* Secretary, R. J. Durley, 2050 Mansfield Street, Montreal, Que.

FEBRUARY 9-11.—LOUISVILLE, KY. (100)
*American Water Works Association—Kentucky-Tennessee Section. Annual meeting.* Executive Secretary, F. C. Dugan, 532 West Main Street, Louisville, Ky.

FEBRUARY 14-16.—ANN ARBOR, MICH. (700)
*Conference on Highway Engineering—University of Michigan. Annual convention.* Secretary, R. E. Morrison, University of Michigan, Ann Arbor, Mich.

FEBRUARY 15-17.—ATLANTIC CITY, N. J. (1,500)
*Association of Highway Officials of North Atlantic States. Annual convention.* Secretary-Treasurer, A. Lee Grover, Secretary, State Highway Commission, Trenton, N. J.

FEBRUARY 20-23.—CHICAGO, ILL. (250)
*National School Supply Association. Annual convention.* Executive Secretary, J. W. McClinton, 176 West Adams Street, Chicago, Ill.

FEBRUARY 21-24.—CHICAGO, ILL. (350)
*American Concrete Institute. Annual convention.* Secretary, Harvey Whipple, 641 New Center Building, Detroit, Mich.

FEBRUARY 21-22.—HARTFORD, CONN. (900)
*Connecticut Society of Civil Engineers. Annual meeting.* Secretary, H. J. Tippet, Box 235, New Haven, Conn.

FEBRUARY 21-24.—WICHITA, KANS.
*Southwest Road Show and School.* Manager, F. G. Wieland, Exposition Building, Water and Williams Streets, Wichita, Kans.

FEBRUARY 22-23.—TORONTO, ONT. (600)
*Ontario Good Roads Association. Annual convention.* Write: S. L. Squire, 98 Albany Avenue, Toronto, Ont.

FEBRUARY 25-MARCH 2.—MINNEAPOLIS, MINN. (10,000)
*National Education Association—Department of Superintendence. Annual meeting.* Executive Secretary, Sherwood D. Shankland, 1201 16th Street, N. W., Washington, D. C.

FEBRUARY 27-28.—TORONTO, ONT. (50)
*American Concrete Pipe Association. Annual convention.* Secretary, M. W. Loving, 33 West Grand Avenue, Chicago, Ill.

MARCH 1-3.—SASKATCHEWAN, SASK. (800)
*Saskatchewan Association of Rural Municipalities. Annual convention.* Secretary, J. J. McGurran, 407 Kerr Building, Regina, Sask.

MARCH 8.—BOSTON, MASS.
*American Water Works Association—New England Section. Annual meeting.* Secretary-Treasurer, Roger W. Esty, Superintendent Water Department, 17 Hobart Street, Danvers, Mass.

MARCH 22-24.—OTTAWA, O&9. (300)
*American Water Works Association—Canadian Section. Annual meeting.* Secretary-Treasurer, Dr. A. E. Berry, Director of Sanitary Engineering, Province of Ontario, Parliament Buildings, Toronto 5, Ont.

MARCH 28-30.—FORT WAYNE, IND. (175)
*American Water Works Association—Indiana Section. Annual meeting.* Secretary-Treasurer, C. K. Calvert, 1902 North New Jersey Street, Indianapolis, Ind.

APRIL 7-8.—PHILADELPHIA, PA. (250)
*American Academy of Political and Social Science. Annual meeting.* Secretary, J. P. Lichtenberger, 3457 Walnut Street, West Philadelphia, Pa.

APRIL 10.—NEW YORK. (350)
*National Committee on Prisons and Prison Labor. Annual meeting.* Secretary, Julia K. Jaffray, 250 West 57th Street, New York.

APRIL 13-15.—GAINESVILLE, FLA. (150)
*Florida Engineering Society. Annual meeting.* Secretary, W. W. Fineran, Gainesville, Fla.

APRIL 21-22.—HAVRE, MONT. (50)
*American Water Works Association—Montana Section. Annual meeting.* Secretary, Herbert B. Foote, State Board of Health, Helena, Mont.

APRIL 23-28.—STILLWATER, OKLA.
*Oklahoma Water and Sewage Conference. Annual conference.* Secretary-Treasurer, H. J. Darcy, State Sanitary Engineer, Oklahoma City, Okla.

APRIL 24-27.—WASHINGTON, D. C. (1,000)
*American Red Cross. Annual convention.* Secretary, Mabel T. Boardman, National Headquarters, Washington, D. C.

APRIL 24, WEEK OF.—WASHINGTON, D. C. (100)
*National League of Women Voters. National meeting.* Executive Secretary, Beatrice H. Marsh, 532 17th Street N. W., Washington, D. C.

APRIL 27-29.—RALEIGH, N. C. (85)
*Southern Commercial Secretaries' Association. Annual meeting.* Secretary-Treasurer, Karl Lehman, Orange County Chamber of Commerce, Orlando, Fla.

APRIL 29-MAY 1.—RALEIGH, N. C.
*North Carolina Commercial Secretaries Association. Annual meeting.* Secretary, Howard B. Branch, Chamber of Commerce, Raleigh, N. C.

MAY 11-13.—BELLINGHAM, WASH.
*American Water Works Association—Pacific Northwest Section. Annual meeting.* Secretary, Ernest C. Willard, 720 Corbett Building, Portland, Ore.

MAY 11-12.—BOSTON, MASS. (500)
*Massachusetts Safety Conference.* Secretary, Lewis E. MacBrayne, 6 Beacon Street, Boston, Mass.

JUNE 11-16.—DETROIT, MICH. (400)
*National Community Center Association. Annual meeting.* Secretary, LeRoy F. Bowman, Hudson View Gardens, Pinehurst Avenue, New York.

JUNE 12-16.—CHICAGO, ILL. (1,200)
*American Water Works Association. Annual convention.* Secretary, Beekman C. Little, 29 West 39th Street, New York.

JUNE 13-15.—CINCINNATI, OHIO.
*Municipal Finance Officers' Association of the United States and Canada. Annual meeting.* Executive Director, Carl H. Chatters, 850 East 58th Street, Chicago, Ill.

JUNE 26-30.—CHICAGO, ILL.
*American Institute of Electrical Engineers. Annual summer convention.* Assistant National Secretary, H. H. Henline, 33 West 39th Street, New York.

JUNE 26-30.—CHICAGO, ILL.
*American Society for Testing Materials. Annual meeting.* Secretary-Treasurer, C. L. Warwick, 1315 Spruce Street, Philadelphia, Pa.

SEPTEMBER 21-23 (TENTATIVE).—MILWAUKEE, WIS.
*International Association of Public Works Officials. Annual convention.* Secretary, A. M. Anderson, 100 North LaSalle Street, Chicago, Ill.

OCTOBER 2-6.—ATLANTIC CITY, N. J. (600)
*National Recreation Association. Congress.* Administrative Secretary, Thomas E. Rivers, 315 Fourth Avenue, New York.

OCTOBER 2-6.—CHICAGO, ILL. (3,000)
*National Safety Council. Annual congress.* Managing Director, W. H. Cameron, 20 North Wacker Drive, Chicago, Ill.

# NEWS AND ILLUSTRATIONS

**Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings**

## Metering Equipment at the New Easterly Sewage Treatment Works, Cleveland, Ohio

After the raw sewage at the New Easterly sewage treatment works of the city of Cleveland, Ohio, has passed through the grit chamber and just before it enters the mixing channels, it is measured through four 72-inch venturi tubes with cast iron throat and inlet sections, and tapered concrete sections for the approach and discharge. The sewage then enters the mixing channels, where it is thoroughly mixed with the return sludge from the sludge settling tanks. This mixture is distributed to 32 aeration tanks. The air to the aeration tanks is measured by sixteen 20-inch venturi tubes, one tube being provided for each pair of tanks. After being thoroughly activated in the aeration tanks, the aerated sewage passes through sixteen 36-inch venturi tubes to the sludge settling tanks, where it is retained for a sufficient length of time to permit all suspended sludge to settle out. The clear liquid effluent from the sludge settling tanks passes directly into the lake through outfall sewers.

The activated sludge which is drawn off passes through sixteen 16-inch venturi tubes which are divided into four groups of four each, and the total output of each group flows through one of four 24-inch return sludge venturi tubes. A small portion of this sludge is then drawn off through four 8-inch excess sludge tubes, and the remainder is returned to the sludge control chambers, from which it flows to the mixing channels, where it is mixed with the settled sewage as previously mentioned.

The 44 Bailey sewage meter registers made by the Bailey Meter Co., 1050 Ivanhoe Road, Cleveland, Ohio, which are used in this plant for the measurement of settled sewage, aerated sewage, activated and return sludge, are of the indicating, recording and integrating float-operated type, designed so that the floats will be the only part of the mechanism that comes in contact with the sewage or sludge. The main operating mechanism is entirely mechanical, with the exception of the chart and integrator drive, which receive their power from a Warren synchronous motor-driven clock.

The Bailey air meter registers are all of the indicating, recording and integrating type employing oil sealed bell-operated mechanisms, designed with a displacer in mercury so that the charts and indicating scales are uniformly graduated. Sixteen of these registers are used in connection with the 20-inch venturi tubes measuring the flow of air to the aeration tanks, and four of these registers are used in connection with 12-inch venturi tubes measuring air provided to keep all sewage or sludge in suspension in the various channels throughout the plant.

The meters are arranged in a conventional manner to facilitate their use as guides to plant operation. The air meters and aerated sewage meters for each aeration tank are installed on individual panel boards adjacent to each other on the operating gallery, so that the ratio of air to sewage can be easily observed and maintained at the desired value. The 16-inch activated sludge meters are likewise installed in a similar location, adjacent to the activated sludge flow control valves. The return sludge and excess sludge meters are flush-mounted side by side on bench type control boards installed in the return sludge pump building, so arranged as to facilitate the comparison of excess sludge and return sludge reading, so that the ratio of these two factors can be maintained as desired. These meters also function to provide the primary impulses for a complete automatic excess sludge control system.

The four settled sludge meter registers which measure the total input to the plant are mounted on individual panel boards on the main floor of the return sludge pump building to measure the total input to the plant at all times. Provision is made in these meters for possible future installations of totalizing equipment so that the total flow through the plant can be indicated on a single instrument.

## A New Front-End Fresno for Tractors

A machine that will dig, load and transport earth on a 150-foot haul at the rate of 30 cubic yards per hour has been announced by the Anthony Co., Inc., Streator, Ill. This Anthony multiple tool digger is built for Caterpillar Twenty-Five tractors in two heights, one a standard size with a clearance of 6 feet 6 inches and a special high lift of 8 feet 6 inches. The boom mounted on the front of the tractor is raised and lowered by hydraulic power to facilitate housing the unit. Either one of these loaders can be converted into a front-end fresno or bulldozer by simple interchange of parts. The low-lift or front-end fresno type machine can be converted into either of the loading machines by raising the head and installing the two boom sections. The high-lift loader can be converted into the front-end fresno by removing a section of the boom. The tools are interchanged by removing the nuts from four bolts which hold the tools to the dolly that rolls in the boom track.

The bulldozer unit can be used for moving earth or snow. The bulldozer moldboard will cut 5 inches below track level, and has a clearance of 54 inches when raised. The 6-foot bulldozer moldboard is controlled by the hoist in the same manner as the shovel; either edge can be tipped and the moldboard can be set at any angle.

## Metallic Zinc Paint for Exposed Metal Surfaces

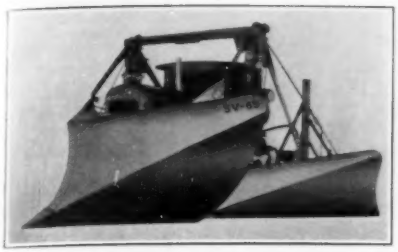
Travelers in the Rhine Valley and other industrial regions of Europe have noticed bridges, towers, and other steel structures painted grey with a metallic zinc paint. In this paint, which is now being used to an increasing extent in the United States, according to the American Zinc Institute, Inc., New York, the principal pigment is a metallic zinc powder of such an extreme fineness that it is frequently referred to as zinc dust. This powder, produced by a distillation process in specially designed furnaces, is mixed with zinc oxide in a linseed oil vehicle of the usual type.

Metallic zinc paint has been found to be a particularly effective protection against corrosion for all exposed metal surfaces. It has been used not only on steel buildings and other structures, but on electrical equipment, on the outside and inside of water tanks and under many other difficult conditions. It has been found to fill a real need in the painting of galvanized iron or sheet zinc surfaces, owing to its unusual ability to adhere to the surfaces, which present an especially difficult problem for most paints. It has been used for some time as a priming coat on all police department traffic signs in New York City and has been used for the same purpose on the Mt. Hope Bridge at Bristol, R. I. This great steel structure is subject to especially severe exposure, owing to the prevalence of heavy salt fogs and variations in temperature.

## A New Lug-Type Tire for Tractor Service

Another new tire for tractor service, a pneumatic companion to the Goodrich Zero Pressure tire, has recently been announced by the B. F. Goodrich Co., Akron, Ohio. Known as the Tractor-Grader tire, this new product is of the lug type, designed for road service and constructed for hard knocks and severe driving torque. The tread design is self-cleaning, constructed to give clean, positive, sharp-edged gear wheel traction. The herringbone design insures straight forward motion and prevents side creep.

This tire is amply insulated with heavy gum coatings between the cord plies to eliminate the possibilities of bruises in severe service. Special consideration was given to the effect on tires of road oils and tar, resulting in a tread particularly adapted for use in building and maintaining tar-bound roads.



THE MOST RECENT LA PLANT-CHOATE SNOW-PLOW

## A New Series of Hydraulic-Operated Snow-Plows

A new series of hydraulic-operated snow-plows for use on the Caterpillar 25, 35, 50, 65 and Caterpillar diesel tractors has been announced by the LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa. These plows include many new and improved features, among which is the newly designed wing hoist, which provides greater facilities for pushing out the side banks of snow.

The wing is lifted simultaneously at three points—at the front of the wing, at the rear of the wing, and at the point on the tractor where the wing braces are attached. In this way the chances of its folding up are entirely eliminated, as the wing brace tubes are perpendicular at all times.

The V nose and wings are raised and lowered by hydraulic pressure obtained from the tractor power take-off. The control levers are placed within the cab convenient to the tractor operator's seat.

## A New Unit for Municipal Refuse Collection

The Rex-Watson Corporation, Canastota, N. Y., has announced a new unit for the collection of ashes, garbage and papers for use of municipalities. This corporation, which for over a half a century has been manufacturing contractor's haulage equipment, has produced a semi-trailer and two full trailers to be used with any make of industrial tractors, all being mounted on rubber tires. The bodies are of hardwood, thoroughly reinforced with steel plates, wheels mounted on Timken bearings, bodies covered or uncovered as desired, with end, side or bottom dumping arrangements, and with automatic wind-up.

By the use of these units, municipalities may be able to make all three collections at one time, materially reducing the cost of operation of their collection units and at the same time reducing the original investment in such equipment. The saving in time which the use of these units makes by their ability to run out onto the dump and over it without unhitching the trailers is in itself important. The semi-trailer illustrated is a special body designed for a special use in deep sand on one of the Atlantic beaches.

## Waterproof Carpet

Something new and very interesting which is claimed to be the first carpet that is guaranteed absolutely waterproof has been announced by the American Playground Device Co., Anderson, Ind. The carpet fibre is impregnated with liquid rubber before being vulcanized to its base. The material is easily cleaned with soap and brush, will not curl or creep on the most highly polished floors, and does not mildew or mold. These qualities afford extreme durability and low maintenance cost.

A SAFETY ISLAND ON NEW JERSEY ROUTE 25 WEST OF THE HOLLAND TUNNEL, WHERE THE BASE WAS BUILT OF ARMORED CONCRETE, AND THE BOND WAS NOT SHATTERED WHEN A TRUCK HIT THE ISLAND HEAD-ON

## Protecting Concrete from Impact

Street curbs, steps, leading platforms, columns and doorways are subjected to many impacts from the rims of truck wheels. To save concrete in these places from spalling, Armored Concrete has been developed. This system, which is sold by Armored Concrete Corporation, 82 Polk Street, Newark, N. J., is a construction composed of concrete and grey cast iron. To the body of concrete which forms its mass is bonded a surface or veneer of grey cast iron. The method of bonding is such that the two diverse materials become a mechanical unit. The resultant basic characteristic of the construction is its ability to withstand damage under the heaviest impacts. It withstands abrasion, corrosion and temperature and moisture variations.

The manufacturer states that this material has been adopted by the United States Government for exclusive use in Government buildings and Naval Hospitals. A large number of pool owners are already using this carpet as a covering for diving boards, but it is also being used as runners in lobbies of hotels and clubs to protect valuable carpets and rugs during slushy and muddy weather. It will eliminate the slipping hazard when used around swimming pools where the walkway is glazed tile or other extremely smooth surface.

## A New Turbine Oil

A new turbine oil has been announced by the Standard Oil Co. of Indiana, 910 South Michigan Avenue, Chicago, Ill., and is guaranteed without reservation to last as long as the turbine itself. In the lubrication of a steam turbine the lubricating oil is pumped rapidly through the bearings and lubricating system. In this rapid circulation it is exposed to moderately high temperatures and becomes intimately mixed with air. The new Nonpareil turbine oil does not oxidize as earlier oils did, and consequently it is not necessary, at more or less regular intervals, to drain off the oil and replace it with new oil. The new oil does not react with air and does not change under use in a turbine. With this oil the customer is furnished a written guarantee to the effect that it will not require replacement during the entire life of the steam turbine installation.

ONE OF THE NEW REX-WATSON ASH AND GARBAGE COLLECTION UNITS

# better construction — BUT STILL LOW-COST

During recent years, when conditions have accelerated the demand for low-cost paving, engineers throughout the country have been turning to Bitumuls, "the modern way to use asphalt".

In this cold asphaltic binder, road and street men have found the answer to the imperative need for high paving standards at lower costs. Likewise, in Bitumuls, they have found the answer to the growing need for a simpler and more economical method of maintenance.

That's why Bitumuls has become an indispensible part of the paving program wherever it has once been used.

Bitumuls construction is permanently nonskid, and durable. There is no bleeding, shoving and corrugating. It does not become brittle. Bitumuls is simple and inexpensive to handle. There is no heating.

Get the complete story. Write for a set of Bitumuls Bulletins. Or communicate your paving problems to a Bitumuls field engineer. American Bitumuls Company, Dept. 4, 200 Bush St., San Francisco, Calif.

# BIT-U-MULS

BIT-YOU-MULLS

## *The Modern Way to Use Asphalt*

(ABOVE) *Building Bitumuls paving on a heavy-traffic State highway in Maine.*

(BELOW) *Maintenance forces widening curve with Bitumuls Penetration pavement; on Jefferson Highway, near Baton Rouge, Louisiana.*

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DRIVING THE ANCHORS OF A FENCE POST FOR AN AVIATION FIELD

## Essential Characteristics for Airport Enclosures

The enthusiastic reception of aviation has necessitated the creation of airports at all important centers. These airports consist of valuable plant and equipment which must be protected like any industrial plant. Chain Link fences provide all the essential qualifications pertaining to enclosures. The fences can be made in any height, with or without barbed wire additions as extra protection. They form a desirable obstacle against trespass and at the same time afford a resilient barrier protecting the public from mishaps.

In a discussion of the engineering essentials of airport enclosures, Captain Frederick Schauss, Manager, Airport Sales Division, Anchor Post Fence Co., Baltimore, Md., describes the type of fences and posts which have proved suitable for enclosures of this type. If these fences are installed with posts fixed in the ground by means of drive-anchors, expansion requirements of the airport are in no way hampered, inasmuch as the entire fence can be taken up and removed to any new property line, without damage to the product and at negligible cost.

Simplicity of installation makes this type of fence anchorage desirable. A pair of malleable iron shoes fastened on opposite sides of the post, just below the ground line, carry two high-carbon steel drive-anchors which are driven at approximately 45 degrees to the ground in opposite directions normal to the fence line, on Anchor Post fence installations of the type under discussion.

When installed, the effect produced bears the same relationship to the post that roots do to a tree. The ratio of resistance to disturbance produced by this method as compared to that produced by the use of concrete footings shows the advantage of the drive anchorage. Even with the post deflected through an arc of almost 90 degrees, there is practically no movement of these anchors. Yet, by the removal of only a small quantity of earth it becomes possible to loosen the shoe bolts, thus permitting release of the anchors and easy removal of the post for relocation.

## Detectors for Traffic Control

Regulation and control of vehicle and pedestrian movements by means of themselves through the action of Vehitrol traffic control equipment consists of detection, recording and timing elements, according to the Horni Signal Manufacturing Corporation, 515-521 Greenwich Street, New York. The magnetic detectors used are designed and manufactured by the Miller Train Control Corporation under the trade name of Trafilator. As the detector is constructed on the principle of a magnetic Wheatstone bridge, the introduction of any metallic substance into the area of reluctance paths as set up by the primary coils causes a balance between or a reversal of the lateral and longitudinal forces. This balance of reversal causes the stoppage of the secondary flux and allows the armature of the detector relay, normally held in a suspended position, to drop to its off position, where momentary contact is made with a back contact, closing a circuit which energizes the "memory" relay which controls the timing element.

Primary coils are energized by a 110-volt, 60-cycle alternating current, which is transformed through the secondary coils and then converted to direct current through a rectifying unit for operating the detector relay. The magnetic detectors are self-contained in a reinforced concrete shell approximately 54 inches long, 14½ inches wide and 8 inches deep, the top being protected by a maganese steel cover. They are completely buried in the highway with the top 2 inches below the surface and are not subject to any physical contact. The cores and coils are completely enclosed in high-grade insulating compound or concrete and require no attention or maintenance after being assembled. Brass junction boxes are provided for all splices to the cables leading to the control.

The mechanical detectors consist of a steel housing in which the mechanism required to maintain a closed circuit at all times is contained. The top is covered completely by a rubber mat so formed that it projects above the metal frame, and passing vehicles climb over instead of sinking into it, in order to make a contact. The circuit is broken as pressure is applied by passing vehicles. A novel method is employed to prevent grounds and short circuits, and the voltage in the detector circuit does not exceed two volts at any time.

As both the magnetic and mechanical detector units operate on the normal closed circuit principle, a similar detector relay is used for both. In the event of the failure of the detector circuit for any reason, the detector relay drops to the off position, causing the timing element to run as a prefixed timing unit for the period set up for that particular circuit. This is an automatic action and does not affect the vehicle influence on any other detector circuit still maintained. If all the detector circuits fail, the timing element will function as a complete prefixed timer until the detector circuits are restored.

The memory relays are of standard Horni relay design with special coils. Mounted in the base is a spark suppressor which eliminates all sparks and prevents the freezing of the contacts from any inductive spark at the contacts of the detector relay. The relays are mounted in the control housing, easily accessible for inspection. One relay is supplied for each phase of the timing element even if two or more detector relays are used for the same movement.

The selector or circuit-making switch is of a rotating drum type operated by its individual motor. Loose cams are mounted on the drum and are held in place by tie rods. The cams can be easily shifted to form any color combination or sequence as required.

The Horni Vehitrol can be furnished for semi-actuated control with one street having a continual "go" signal and with changes being effected only by calls from the cross street, or with full actuated control with detection provided on all approaches, for two or three vehicle movements with or without pedestrian periods. It can be used as a prefixed timer at will and is readily converted into a semi-actuated timer for the purpose of obtaining time for moving large bodies of pedestrians at school or church periods or at hours for factory employees. It can be connected to and operate the present signal lights.

THE "BRAINS" OF THE HORNI VEHITROL SYSTEM

# *INDIANA* Leads all States in Miles of Paved Roads

*A complete highway system . . . with a large percentage of low cost bituminous roads . . . resulting in a low average cost per mile*

THE State and County Highway Departments deserve much credit for these roads which are advantageously located and well maintained with a low bonded indebtedness.

This system provides all year around transportation for rural and city traffic and an exceptionally low cost of U. S. postal and parcel delivery.

Many hundreds of miles of these roads were constructed with Standard Asphalt Road Oil and Stanolind Cut Back Asphalt.

Roads constructed with Standard Asphalt Road Oil and Stanolind Cut Back Asphalt can be built not only at a low cost, but because of their durability and resistance to traffic wear, can be maintained at a very small expense.

STANDARD OIL COMPANY
(Indiana)
910 South Michigan Avenue Chicago, Illinois

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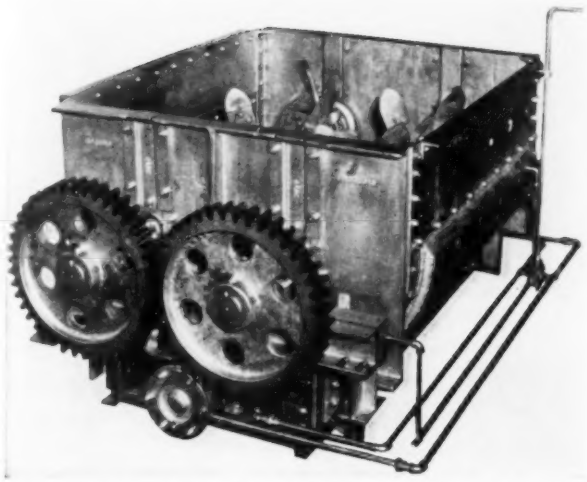
INDIANA
HARRY G. LESLIE, Governor

Indiana State Highway Commission
Albert J. Wedeking, Chairman Robert B. Boren, Vice-Chairman
Arthur P. Melton Arthur H. Sapp J. J. Brown, Director

Do you mention THE AMERICAN CITY. Please do.



THE NEW IROQUOIS 40-CUBIC-FOOT ASPHALT PUGMILL MIXER

## A New 2-Ton Asphalt Pugmill Mixer

A pugmill mixer with a double slide giving a larger opening which permits quicker discharge of the material from the mixer has been announced by the Iroquois Works, The Barber Asphalt Co., Philadelphia, Pa. The slide gates are castings fitted with manganese steel liners and form the entire bottom of the mixer. One slide liner is longer than the other, so that when the gates are closed the long liner extends partially over the other slide, abutting upon the shorter liner and thereby preventing leakage at the center. Since part of the slide when opening passes out of the mixer, cast iron slide scrapers fastened to the end casting inside the mixer are provided which sweep the slide clean.

Each slide moves on two series of three steel slide rollers, equally spaced, and the rollers move on two steel rails supported under the mixer and well out of the way of the material being discharged.

The end castings are equipped with slots into which are fitted special cast iron gap plates, which are fastened in place by four bolts to facilitate removal. These plates are flanged over on the outside to prevent leakage of material at this point. Around each shaft on the inside of the mixer is a cast iron cheek plate fastened to both the end casting and the gap plates by flat-head bolts. The inside face that is nearest the center of the mixer is chilled so that it presents a glass hard surface. Adjacent to this cheek plate is another cast iron cheek plate loose on the shaft so that it revolves with it. The outside face that is next to the stationary cheek plate is also chilled. These two faces, being hardened and rubbing against each other, make a tight connection, preventing leakage without the necessity of having a packed joint. The mixer shaft bearings are mounted on structural steel members independent of the end castings and are in turn mounted on the main frame carrying the mixer, which is usually a part of the mixer platform. Thus the load at each bearing is carried by the platform and not by the castings.

One of these 40-cubic-foot Iroquois asphalt pugmill mixers was used by Kolite Asphalt Roads, Inc. of Buffalo, N. Y., at its job near Portland, N. Y., to mix material used for resurfacing New York State Route No. 20 between Fredonia, N. Y., and the Pennsylvania state line. Its maximum capacity in mixing New York State type for cold mix, which specifies a mixing time of 4 minutes per batch, was 600 tons in one day of 22 hours.

## Houston New President of Ludlow

Livingston W. Houston, who has been connected with the Ludlow Valve Manufacturing Co. for thirteen years, has been elected President of the company, according to recent announcement by the Board of Directors. Mr. Houston succeeds William H. Lolley, who recently resigned as President. Mr. Houston is a graduate mechanical engineer of many years' experience, and prior to association with the Ludlow Valve Manufacturing Co. has held important engineering executive positions. He was at one time Captain of the Ordnance Department, U. S. Army. Mr. Houston is well known in the valve industry and in eastern manufacturing circles.

According to Mr. Houston, no changes are contemplated in either personnel or the policies and program of the company. The management of the Ludlow Valve Manufacturing Co. will continue a forward-looking policy of continued research and product improvement in both the valve and the hydrant divisions of the Ludlow business.

## Reciprocal Agreement Between Manufacturers

The LaPlant-Choate Manufacturing Co., Inc., of Cedar Rapids, Iowa, has announced the completion of negotiations with the Knapp Manufacturing Co., Oakland, Calif., for the joint manufacture and sale of the earth-moving products of each company. The Knapp Company will handle distribution for all products of both companies on the Pacific coast, while the sales and distribution in the Middle West and the East will be handled by the LaPlant-Choate Manufacturing Co. These companies will now market a complete line of earth-moving products, including bulldozers, scrapers, wagons, backfillers, roadbuilders, tampers, ripper plows and bullscoops. The LaPlant-Choate Manufacturing Co. will make the Knapp scraper in three sizes for use with the Caterpillar 35, 50 and 65 or diesel.

## Scharff Again Joins Morris Knowles, Inc.

Morris Knowles, Inc., consulting engineers, Westinghouse Building, Pittsburgh, Pa., and 1 Wall Street, New York, has announced the renewal of the association of Maurice R. Scharff, consulting engineer, of Pittsburgh and New York, with that organization. Mr. Scharff was connected for many years with the late Morris Knowles as Vice-President and Assistant Chief Engineer for Morris Knowles, Inc., and has maintained close contact with the company since retiring from these positions. The company will continue under the direct supervision of Nathan B. Jacobs and Myron G. Mansfield, who have been continuously associated with it since its incorporation to specialize in water supply and purification, sewerage and sewage disposal, power plants, industrial waste and refuse disposal, city planning and real estate developments, municipal and public utility engineering, consisting of investigations, reports, design, supervision of construction and operation, management, appraisals, rates, and bacteriological and chemical analyses.

## Bituminized-Cement Macadam Roads

As a step beyond the old cement-bound macadam road which has been built in the United States, the Medusa Portland Cement Co., Cleveland, Ohio, has announced a bituminized cement for building this type of road which greatly reduces the cost of a finished concrete pavement. Furthermore, the introduction of bitumen with the cement retards setting, making it possible to roll the pavement satisfactorily during construction.

About 200 miles of this type of pavement are in service in Germany, France, Switzerland, Jugoslavia and Finland. The first major installation in the United States is in Hampden, Mass. The first operation in laying the macadam is to spread a 2½-inch layer of large stone over the subgrade. This is rolled to provide a fairly smooth surface for the application of the mortar. Then a layer of 1:2½ special cement and sand mortar is spread over the lower stone course to a depth of 2½ inches. Immediately after the mortar is spread, a second course of stone, identical with the first in thickness and size, is applied by hand-spreading. Then a 12-ton 3-wheeled roller rolls the macadam continuously until the mortar works up to but not over the surface.

Next the surface is sealed with thin mortar brushed into place with steel brooms. After the seal coat has dried out sufficiently so that it will not pick up, a light tandem roller compacts the seal mortar into any possible voids surrounding the top stone. The final treatment includes brushing another layer of thin mortar over the surface, on which is spread stone dust and chips, lightly rolled. The bituminized cement used in this work is being manufactured in the United States by the Medusa Portland Cement Co., Cleveland, Ohio, under a special license which will be extended to other manufacturers.

# Barrett Tarvia

GOOD ROADS at LOW COST

*Allentown-New Egypt Road, near Cream Ridge, New Jersey. Tarvia-built, 1930.*

The Barrett Company

| | | |
|---|---|---|
| New York | Chicago | Philadelphia |
| St. Louis | Minneapolis | Hartford |
| Detroit | Cleveland | Boston |
| Buffalo | Columbus | Milwaukee |
| Providence | Syracuse | Birmingham |
| Lebanon | Toledo | Cincinnati |
| Baltimore | Youngstown | Bethlehem |
| Rochester | | Portland, Me. |

THE BARRETT COMPANY, Ltd.
Montreal Toronto Winnipeg Vancouver

IT IS as unsound economically to build too well as to build not well enough. Heavy-traffic roads at heavy-traffic prices on light-traffic routes not only waste taxpayers' money but also waste time, for the high-priced road usually has to be waited for.

Tarvia roads are always economical for they never need be over-built or under-built. There is a right type and strength Tarvia road—smooth, easy-riding and skid-safe—for every traffic requirement. And the Tarvia laid today for light traffic will serve as a foundation for stronger Tarvia pavement as traffic needs increase.

Tarvia is made by The Barrett Company, America's oldest and most experienced manufacturer of coal-tar road-building materials. All of Barrett's unmatched facilities—manufacturing skill, distributing equipment and paving experience—are available to road engineers and highway officials through the Tarvia field man. 'Phone, wire or write our nearest office.

THE RUBBER-SHOD MILK-WAGON, HORSE AND MILK CONTAINERS

## A Help to the Anti-Noise Campaign

Whenever a newspaper writes a story of an anti-noise campaign, the first individual he talks about is the milkman. The clatter of horses' hoofs and the rattle of metal-tired wagons and the clinking of bottles make a lot of noise in the early hours when most folks are asleep. At the 1932 National Dairymen's Show at Detroit one of the exhibits was a horse-drawn milk wagon with streamline Jumbo tires, produced by the General Tire & Rubber Co., Akron, Ohio. The horse had rubber shoes and the milk containers were rubber-insulated. This is something for the anti-noise campaigners to take into consideration.

## Western New York Representative for Rex-Watson

The Rex-Watson Corporation, Canastota, N. Y., has announced the appointment of Clayton S. Carris, of Savannah, N. Y., as its New York State representative. Mr. Carris has automotive experience dating back to 1903, and during the past eleven years has served the White Company as branch manager and the Stewart Motor Corporation as district sales manager.

## Water-Works Leak Detectors Perform Valiant Service

A leaking house service connection in one of the town water mains in Bedford, Mass., furnished an interesting test for the Geophone manufactured by the Globe Phone Manufacturing Corporation, Reading, Mass. The service connection in this particular house is several hundred feet in length, through sandy ground, and has been giving trouble for a number of weeks. A series of leaks developed in one stretch of the piping, but, owing to the nature of the ground in which the connection was laid, the escaping water did not rise to the surface at any point. The sound of running water could be detected at the point where the service connection entered the house cellar, but there was no way of determining where along the line of the service connection the leak actually was.

A Geophone was secured from the Globe Phone Manufacturing Corporation and used to locate the leak. The Geophone consists of two discs each about 1 inch thick and 4 inches across, from each of which leads a tube ending in an earpiece, similar to a stethoscope. The discs were placed on the road surface on the line of the service connection, and the operator held an earpiece in each ear. By placing the two discs as far apart as the length of the tubes permitted, it was noted that the noise in one ear was louder than in the other. The less loud disc was then shifted backward and forward until the sounds from both were equal. The Water Commissioners were astonished to find that the Geophone gave indications of running or leaking water throughout the entire length of the service connection, but the strongest indications were given by the instrument throughout 30 or more feet where it was later found that the leaks actually existed, when the piping was uncovered. The leaking water had been sinking down through the sandy ground as fast as it came out of the pipe, and the surface of the ground was just as dry at that point as it was anywhere down the line of the service connection where no leak existed. About 30 feet of leaking service pipe was replaced, and after this it was not possible to detect any indication of leaking water throughout the service. This test alone saved the Water Department the necessity of uncovering several hundred feet of buried water pipe in an effort to find the leak. It has demonstrated that the Globe Geophone was a necessary piece of equipment for the Department.

## Lawn Mower Company Appoints New Distributor for Chicago

The Ideal Power Lawn Mower Co., Lansing, Mich., has recently announced the appointment of the Chicago Fence & Wire Co., 4400 Addison Street, Chicago, as its exclusive distributor. The new distributor, in broadening its activities in this territory, has adopted a new name and henceforth will be known as the Chicago Fence & Equipment Co.

## A Black Top Paver for Resurfacing

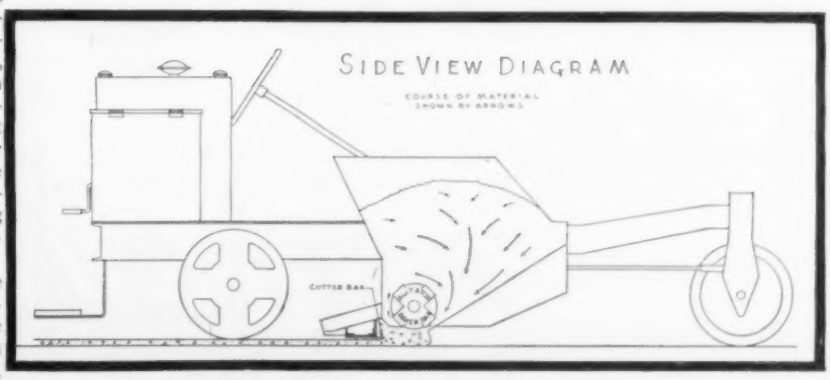
A mechanical asphalt spreader which lays a complete black top road has been placed on the market by the Adnun Engineering & Manufacturing Co., Nunda, N. Y. This 5-ton Adnun Black Top Paver is of the four-wheel-drive type with rubber-tired front wheels extended well ahead of the hopper to secure a relatively long wheelbase. The rear portion of the machine is carried on large-diameter wide-face rollers and power is supplied by a 24-horsepower motor.

A steel hopper 10 feet in width extends across the central portion of the machine. The hopper has an adjustable front end for varying the width of the opening at the bottom and regulating the flow of material from the hopper onto the subgrade. Parallel with the opening in the bottom is a raker bar with teeth pitched at an angle so as to spread the material evenly throughout the length of the hopper, break up any lumps and assist the flow of material from the hopper onto the subgrade.

Directly at the bottom and rear of the hopper is a reciprocating cutter bar having undercut beveled teeth, not unlike those on the mowing machine, which cuts off the material as it comes from the hopper and passes over it, compressing and leveling it off in measured thickness. The cutter bar is carried on heavy springs and is adjustable for varying the thickness from ½ to 3½ inches, also for crowning and banking curves. When the adjustment is once set, it will continue to produce the same thickness of material until changed.

This mechanical asphalt spreader will use material which has become lumpy owing to long hauls or storage in cars. The machine has two working speeds, one of 10 feet per minute and one of 25 feet per minute. It therefore has a capacity to lay 600 feet per hour in low speed or 1,500 feet per hour in high. In addition to the operating speeds both forward and reverse, it has a traveling speed of 150 feet per minute for moving from place to place.

To load the hopper, the supply truck backs up between the front wheels, which run inside the shoulder on the subgrade, dumping approximately three tons into the hopper. The usual 6- to 8-ton trucks ordinarily dump three times.




SCHEME OF OPERATION OF THE ADNUN BLACK TOP SURFACER

*Views of the new Mt. Vernon Memorial Boulevard connecting the nation's Capital with the home of Washington. Contractors: Roberts Paving Company, Salisbury, Md., and McDougald Construction Company, Atlanta, Ga. Carey Elastite Expansion Joint used throughout—supplied by Asbestos Covering & Roofing Co., Washington, D.C.*

Carey Elastite
REG. U.S. PAT. OFF.
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Expansion Joint

# "Makes Good Paving Better"

For over 20 years Carey Elastite Expansion Joint has been protecting concrete highways against expansion and contraction stresses. Engineers specify it to insure definite results—road builders know that it is stocked in all principal centers, insuring prompt delivery.

1933 price list and trade discounts will be sent on request.

**THE PHILIP CAREY COMPANY • *Lockland*, Cincinnati, Ohio**
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BUILT-UP ROOFS
ASPHALT PRODUCTS
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HEAT INSULATIONS
ASBESTOS MATERIALS
CORRUGATED ASBESTOS SIDING
ASPALTSLATE SHINGLES
ROLL ROOFINGS

THE GODWIN SAFETY ISLAND

## A Reflecting Safety Island for Pedestrians

A safety island that includes a turret of concrete sufficiently strong to stop any motor vehicle with head-on impact and a concrete platform which is raised 7 inches above the street to guide motor vehicles into their proper driveway has been announced by W. S. Godwin Co., Race and McComas Streets, Baltimore, Md. This Godwin safety island provides absolute protection to the pedestrian. The entire approach end of the turret is covered with polished, stainless steel. The floodlight mounted in the bottom of the signal lamp illuminates the sloping portion of the turret and directs the light toward the approaching motor car. In addition, the upper or vertical portion of the turret returns the headlight rays to the driver.

The edge of the entire Godwin safety island is bound with a beveled curb guard that guides the wheels away from the island so that no overhanging part of the car may strike any part of the island. This feature prevents all the car damage usually caused by safety islands. The edge of the entire island is protected with Godwin heavy-duty curb guard which is anchored into the concrete sufficiently strong to withstand wheel impact and shear and to guide motor car wheels into their proper driveways without damage to the island. The turret is placed so that it cannot be struck, chipped or scarred by overhanging parts of the car.

The entire assembly for the turret and front part of the island is so designed that it may be set in place and filled with concrete. Both the steel riser or facing which is welded to the curb guard and the reflecting steel front of the turret act as forms for the concrete. This eliminates the necessity for constructing expensive wooden forms for the concrete. This unit may be used without a pedestrian platform if desired. Where pedestrian platforms are required, it is only necessary to set in place a complete Godwin curb guard and facing assembly and fill it with concrete. The turret and platform units are provided with malleable iron inserts cast into the concrete. With eyebolts screwed into the inserts, these semi-portable units can be readily removed and replaced.

## Doran Becomes President of Municipal Sanitation Corporation

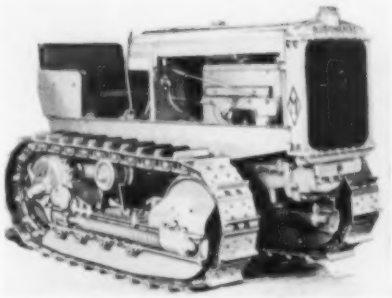
John E. Doran, Vice-President in charge of sales for B. Nicoll & Co., Inc., 292 Madison Avenue, New York, has resigned to become President of the Municipal Sanitation Corporation, of Bridgeport, Conn. Mr. Doran has been associated with B. Nicoll & Co. since 1922 and was instrumental in introducing and marketing French cast iron pipe to the water-works field some years ago. In later years, being interested in municipal sanitation, he was one of the pioneers in advocating covered bodies for the collection of municipal refuse. Under his supervision the Colecto body, a mechanically loaded, entirely enclosed refuse body, was introduced to American cities.

The Municipal Sanitation Corporation will now be the exclusive manufacturing and selling agent for the various types of Colecto bodies and the Colecto catch-basin cleaning machine, as well as for other sanitation equipment for streets, sewage and refuse collection and disposal.

## A Bucket Loader with an Improved Feeding Device

An improved feeding device has recently been announced for the Haiss bucket loader, manufactured by the Geo. Haiss Manufacturing Co., 142nd Street and Park Ave., New York. The revolving paddle feeding device which has been a characteristic of Haiss loader design has now been equipped with new form paddles in which a renewable tip is an integral part of the design. The separable paddle tips are not only renewable but also reversible, so that when the original outer edge is worn down, the tip piece may be reversed and a new unworn edge brought into play.

These tips are made in two forms, a smooth-edged design for handling stone, gravel and similar material, and the serrated-edge paddle for excavating and handling top soil.



THE NEW MODEL M ALLIS-CHALMERS TRACK TRACTOR

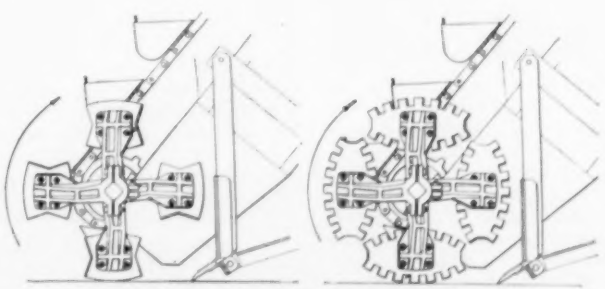
## A New 28-Horsepower Crawler Tractor

A new track-type which represents years of research and engineering, and which has been tested in every way possible to demonstrate its ability to stand up under hard, continuous work, has been announced by Allis-Chalmers Manufacturing Co., Tractor Division, Milwaukee, Wis. This new Model M follows the general design of the AC Model 35 and Model L. It is modern in every feature and is equipped with four speeds forward, renewable cylinder sleeves, unit construction and steering clutch control. Ample power is furnished by an engine which will deliver approximately 28 drawbar horsepower. The Model M weighs 6,200 pounds, and the track shoes are 12 inches in width.

The wide variation of speeds from 2.23 to 5.82 miles per hour increases the tractor's range of usefulness. It can work at high speed in loose or wet soil and handles readily in close quarters. Its over-all length is 101 3/8 inches and its over-all width 57 1/4 inches. The height of the tractor from the ground to the top of the radiator is 56 3/16 inches.

## A Line of Diesel-powered Trucks

A line of thirteen diesel-powered trucks has been announced by the Sterling Motor Truck Co., Milwaukee, Wis. The new models range in capacity from 4 tons upwards and are designed for all types of heavy-duty service, including road building, excavation work, and hauling and transportation. There are also special chain-drive diesel-powered models in addition to the conventional type of enclosed rear drive. Fuel costs are reduced 60 to 75 per cent.



DIAGRAMS OF THE RENEWABLE PADDLE TIPS ON THE HAISS PORTABLE BUCKET LOADER

# Outdoor Lighting

**A Section of *The American City***
**Devoted to the Lighting of Streets, Highways, Bridges, Airports, Athletic Fields and Parks, and the Floodlighting of Public Buildings**

## Light, the City's Great Protector

*By* DUDLEY M. DIGGS
**Chairman, Committee on Highway Lighting and Safety, Illuminating Engineering Society**

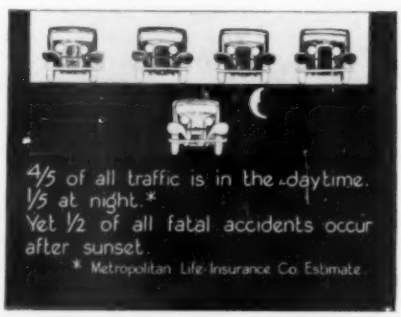
*Mr. Diggs has presented on several occasions—recently at a New York sectional meeting of the American Institute of Electrical Engineers—an unusually interesting lantern-slide talk which effectively emphasizes the importance of street lighting in modern urban civilization. He has prepared the accompanying article based on this talk and illustrated by a few of the many slides that he uses. His connection with street lighting and public safety and his interest in their close relationship go back twenty years, and he has become well known as a speaker and writer on this theme as well as through his activities as special representative of the General Electric Co. in street-lighting matters and his work with the Illuminating Engineering Society.*

IN "The Mansions of Philosophy" Will Durant described the steps man has taken in climbing up from savagery. The first step mentioned is Speech. The second is Fire. Of fire he writes: "For fire made man independent of climate, tempered his tools to hardness, and offered him, as food, a thousand things inedible before. Not least of all, it made him master of the night. Picture the dark before man conquered it; even now the terrors of that primitive abyss survive in our blood. Once every twilight was a tragedy, and man crept into his cave at sunset trembling with fear. Now the night is overspread with a billion man-made stars and the spirit of man is free. We shall never be grateful enough for light."

Even in ancient days, LIGHT was man's great protector

Who supplies us with this light? The cities.

The most important function of government—particularly municipal government—is the protection of its citizens. This must be done by the municipality, not by the individuals, if it is to be effectively and efficiently done. The municipalities, however, like individuals and corporations, are faced with the demand for economy; and therefore, every expenditure should be carefully studied to be sure that it gives value received for dollars spent.


4/5 of all traffic is in the daytime.
1/5 at night.*
Yet 1/2 of all fatal accidents occur after sunset.
* Metropolitan Life Insurance Co. Estimate

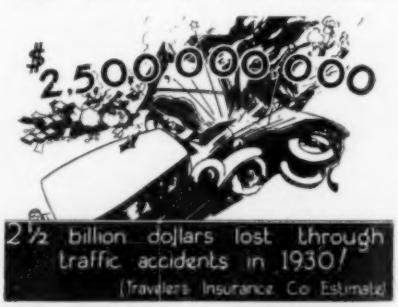
On account of its importance rather than its cost, street lighting justifies a most careful study. In order to do this, we must look carefully at the relation of street lighting to crime and traffic accidents.

In 1931 there were 33,500 persons killed and 1,200,000 injured in 900,000 motor-vehicle accidents in the United States alone.

It is a story told in death, suffering, grief and anguish, and one in which the human appeal is great. Much has been said and written about the education of the driver, which is one of the great fundamentals. This must continue if we are to prevent a great part of this loss and suffering. Not enough, however, has been said about that rapidly rising tide of night accidents that are preventable. In order that we may best see this picture, we must analyze some of the available data.

The economic loss from these 900,000 accidents has reached the tremendous total of $2,500,000,000* and the cities account for 50 to 75 per cent of this total. We also know from collected statistics that 47 per cent, or nearly one-half, of all the accidents occur during the hours of dusk and darkness. From the National Safety Council we learn that 35 per cent of all night accidents are directly attributed to the lack of adequate illumination. From these statistics we can figure the preventable losses.

| | *Economic Loss* |
|---|---|
| Total loss from traffic accidents.. | $2,500,000,000 |
| 50% within the cities..... | 1,250,000,000 |
| 47% of the city accidents occur at night ..... | 587,000,000 |
| 35% of the city night accidents preventable by adequate illumination ..... | 205,625,000 |




Applying these percentages to the 1931 U. S. accidents, we find that we could have saved 2,500 persons from death and 68,000 persons from injury during this one year alone.

These startling figures immediately raise the question, "What is the difference in accidents on the same street before and after adequate lighting?"

### Direct Comparison of Same Streets with Different Degrees of Illumination

In London during the World War, when the danger from night air raids

*The Travelers Insurance Co. estimate.

was greatest, street lamps were either extinguished or carefully screened. During this period (1913-15) the non-fatal night accidents increased 63 per cent, while during the same period the non-fatal day accidents increased only 34 per cent. Similarly, fatal night accidents increased 21 per cent, while fatal day accidents increased only 6 per cent. The larger number of day accidents is attributable to the increase in the amount of traffic. The very much larger number of night accidents over and above the day accidents is the result of the reduced street illumination.

Another investigation indicative of actual results on poorly lighted versus well lighted streets is contained in a Cleveland survey.

Of four parallel heavy-traffic streets in Cleveland, two were well lighted and two were poorly lighted. During the daytime, when there was no difference in illumination, two of these streets had more traffic fatalities than the other two.

At night the situation was reversed.

In seeking the cause we find that the streets with the higher night fatalities were the two poorly lighted streets. During the first year of this investigation, there were seven times as many night fatalities on the poorly lighted streets as on the well lighted ones.

A new lighting system was installed on one of the poorly lighted streets. For nine months prior to this new installation, there were five night fatalities on this street. On the other hand, for the twelve-month period following the installation of good lighting there was only one fatality and during the second twelve months only three.

The other poorly lighted street was relighted two years later. Here again we find six night fatalities per year for the two years preceding the installation of the good lighting and only two fatalities per year for the two years following the installation of good lighting.

Better street illumination was the only change made on these streets.

### Reduction in Other Cities

Upper State Street, one of the traffic arteries of Schenectady, N. Y., during the years 1928 and 1929 was illuminated in the same manner as a high-class residential street might be. New lighting with higher candlepower lamps was installed about January 1, 1930. During the two years with the old lighting (1928-29) five persons were killed in this area. During the two years in which this street has been well lighted only one person has been killed, notwithstanding that the traffic has been much heavier during the latter two years.

That there is a definite relation between street lighting and traffic accidents is still further borne out by cities in other sections of the country. San Francisco recently increased the lighting on Bay Shore Boulevard and the night accidents dropped 40 per cent during the first six months compared with the same period preceding, whereas day accidents increased 30 per cent during the same period. On the other hand, Detroit recently decreased its lighting, thinking this would be an economic move. The fatal night accidents for the first four months of 1932 increased over 30 per cent compared with the first four months of 1931.

### Influence of Street Lighting on Crime

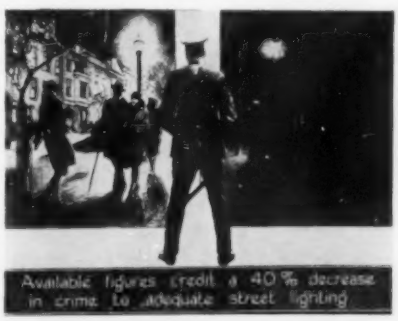
So well understood is the preference of the evil doer for darkness that the unusual daring of the man who commits a daylight crime is featured in newspaper headlines, while the same crime committed at night is noted in a paragraph as a commonplace.

The effectiveness of street lighting as a deterrent to crime is crystallized in the oft-quoted statement that "a street lamp is as good as a policeman." The most striking illustration of the importance of lighting in preserving community safety comes when, by accident or otherwise, all street lamps are out for a period of time. For example, in Chicago during the war an attempt was made to reduce coal consumption by extinguishing the street lamps. The following newspaper headlines indicated the result:

**CHICAGO DARK: BANDITS BUSY**
**Thirty-two Holdups and Many Other Crimes in Two-Day Period**

**MAYOR'S MOTOR STOLEN**
**Street Lighting Turned Off to Save Coal, Turned on to Save People**

A crime survey in one of our larger cities covering over 1,000 cases showed a marked decrease in crime. The city as a whole was compared with a newly lighted section. The newly lighted section showed an 8 per cent decrease during the same period, in which the rest of the city showed a 54 per cent increase, thus making a comparative decrease of over 60 per cent.




Russell A. Algire, Vice-President of the National Surety Co., is authority for the statement that the annual loss due to burglary and theft is approximately $250,000,000. This does not include such crimes as forgery, fraud, embezzlement, etc. Therefore, the crimes responsible for this loss are primarily night crimes. As such, we can expect better street lighting to reduce them materially. Several authorities estimate that first-class lighting would result in an economic saving of approximately $100,000,000 per year by crime reduction alone.

### Relation of Street Lighting to Other Civic Activities

Fortunately, in obtaining protection by means of street lighting other benefits are reaped, among these being:

1. Increased property values. Streets show a decided increase in persons traversing them after lighting. One count shows over 25 per cent increase. Real estate improvements are made. On a certain street in a western city, a number of merchants had intended to move when their leases expired. New lighting was put in and they renewed their leases. Thus the lighting helped to stabilize this section and keep it of a very high class. This is a valuable advantage, for any section which deteriorates is a detriment to the whole city.
2. More business from residents. Due primarily to night "window shopping."
3. More buyers from out of town. Attracts more people from out of town and makes it attractive for them to stay overnight.
4. Greater civic pride.
5. Help for the fire department.
6. Promotion of other industries.
7. More sanitary conditions of streets.
8. Improved traffic control.
9. Increased speed with safety.

In the United States less than 2.6 per cent of the annual municipal expenditures for maintenance and operation is spent on street lighting. In the last two decades the average expenditure for street lighting has increased at a much slower rate than expenditures for schools, health and sanitation, charities and protection.† If we are to light our streets for protection from accidents, crime and vandalism as well as obtain many additional other benefits, it is absolutely necessary that we spend an adequate proportion of the tax dollar for street lighting. For every dollar spent on street lighting, it is estimated that we save $2.75 in economic loss and the cost of crime. Are we not, therefore, justified in making a greater investment in street lighting, even though it is necessary to cut down on other municipal expenditures?

† This is strikingly shown by the chart, derived from the Census Bureau's financial statistics of cities of over 30,000 population, which appeared at page 114 of THE AMERICAN CITY for June, 1932. A similar chart is used by Mr. Diggs as a lantern slide.

# Lighting the George Westinghouse Bridge

THE busy industrial valley of Turtle Creek, in western Pennsylvania, is now spanned at East Pittsburgh by a magnificient concrete bridge, 1,510 feet long and consisting of five arches, rising to a height of 200 feet above the valley floor, and having a total width of 56 feet, of which 42 feet is roadway. It is named after George Westinghouse, the inventor, whose name is also pepetuated in two huge industries of the valley.

The bridge is part of a five-mile highway improvement, forming part of the Lincoln Highway and eliminating a serious bottle-neck condition. It is estimated that 6,171 motor vehicles will use the new route every 24 hours, at a saving of 20 minutes per vehicle.

The importance of adequate lighting of the bridge for accident prevention and effective handling of traffic after dark was recognized to be of great importance, particularly since accidents occurring on bridges are usually attended with greater personal risk and result in more serious traffic stoppages than on traffic arteries in unrestricted sections.

To obtain effective and uniform illumination on the surface of the road and sidewalk and to show clearly the curb line between sidewalk and roadway as well as the extreme outer edge of the bridge, the lighting units were mounted upon the railing at the outer edge. Objectionable glare was avoided.

The lighting standards are attached directly to the tops of the posts of the bridge railing on the outside of each walkway. The standards are staggered, and spaced about 95 feet apart, with the light center of the lamp 21 feet above the roadway. The new Westinghouse Titan Luxsolite pendent lighting unit is suspended from an ornamental bracket by means of a self-aligning pendent adjuster. The ornamental bracket is supported on top of a 20-foot fluted Trusteel standard. The lighting unit is equipped with a 6,000-lumen, 20-ampere lamp enclosed in a Monax glass globe. The total number of units is 18.

NIGHT VIEW ALONG ROADWAY OF GEORGE WESTINGHOUSE BRIDGE

A constant current of 7.5 amperes is supplied to the bridge from a 34-kw station-type constant-current regulator. The regulator is in the United Switchboard station and is manually operated. The straight series line is connected to the primaries of individual isolating current transformers in the bases of the lighting standards, thus isolating the lighting unit and standard from the high-tension line and also making it possible to use the more efficient 20-ampere lamps.

J. F. MORTON,
Illuminating Engineering Department,
Westinghouse Electric & Mfg. Co.

THE LIGHTING STANDARD AND UNIT

## The Newark-Jersey City Viaduct and Its Lighting

*(For airplane view see front cover)*

A VIEW AT THE NEWARK END

This tremendous achievement in engineering and public-works construction extends for 3.74 miles across the Hackensack and Passaic Rivers and their "meadows." (The Passaic River Bridge appears at the right above.) It was built by the State Highway Commission of New Jersey, with J. L. Bauer as State Highway Engineer. It is estimated that 50,000 vehicles per day can be accommodated. Lighting for a heavy volume of night traffic presented an important problem, a discussion of which, with additional photographs, will appear in this section in February.

## Color Floodlighting for St. Paul City Hall

THE St. Paul City Hall and Courthouse, a photograph and general description of which appears on page 79, is equipped with an ornamental floodlighting installation designed to illuminate the upper portion of the building in colors: a type of illumination never before used in the Northwest, according to the St. Paul Association of Commerce. Three colors may be used—red, amber and blue. Control equipment is provided to blend and vary the colors automatically according to a pre-arranged schedule. This equipment is so flexible that it permits a great number of combinations and beautiful effects. The operating equipment includes reactor dimmers controlled by Thyratron tubes.

In addition to the color lighting, each of the corners of the tower is illuminated with white light by two giant floodlights placed at the base of the tower.

The street-lighting units shown are those generally used in the central business district of St. Paul. They have two-light standards, of pressed steel with Saratoga top, with 500- and 300-watt lamps at a mounting height of 23 feet.

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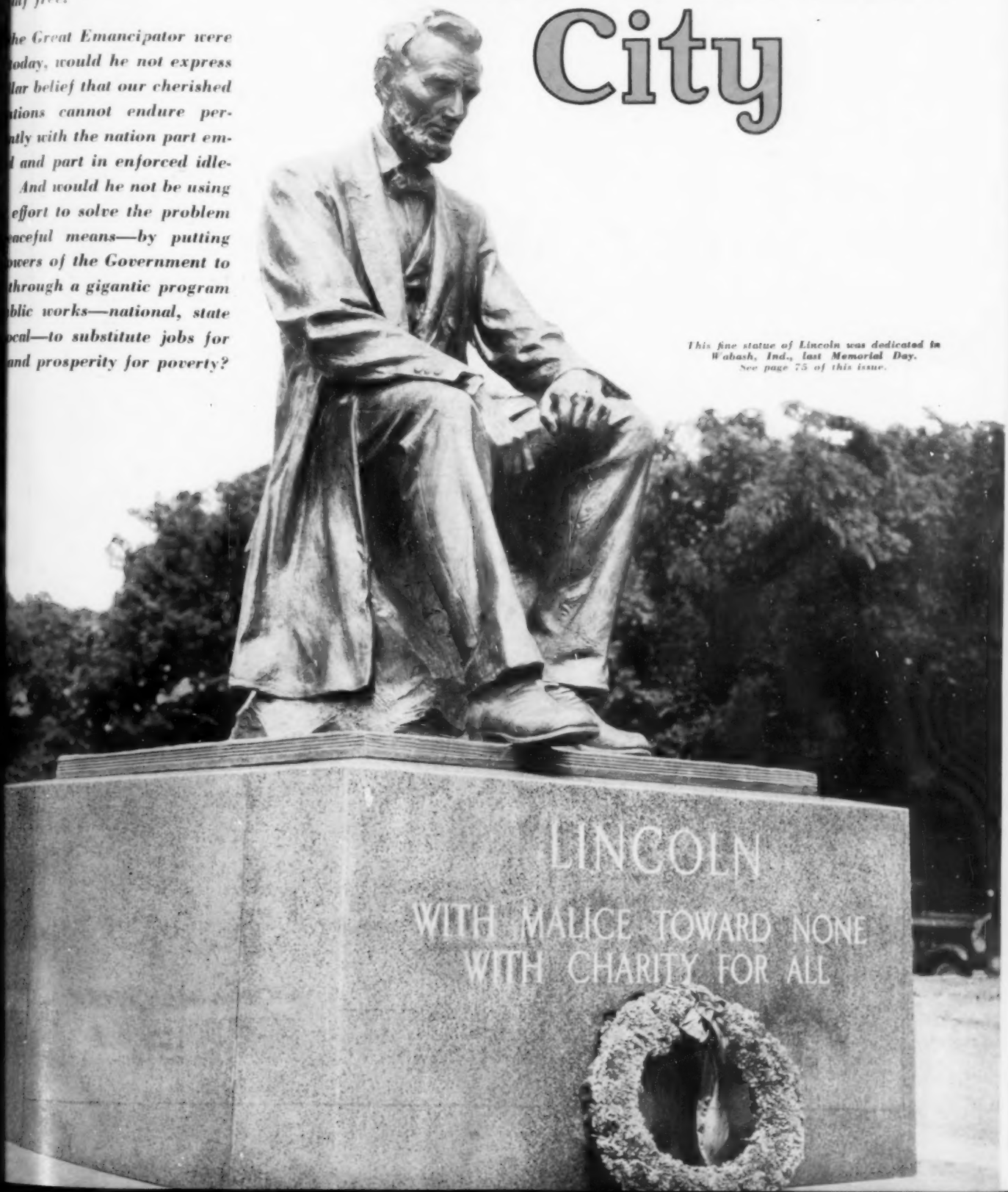
# The American City

*believe this Government," Abraham Lincoln, "cannot e permanently half slave alf free."*

*he Great Emancipator were oday, would he not express lar belief that our cherished tions cannot endure per- ntly with the nation part em- d and part in enforced idle- And would he not be using effort to solve the problem aceful means—by putting wers of the Government to through a gigantic program blic works—national, state cal—to substitute jobs for and prosperity for poverty?*




*This fine statue of Lincoln was dedicated in Wabash, Ind., last Memorial Day.*
*See page 75 of this issue.*